

DOCUMENT RESUME

ED 431 104

CE 078 770

TITLE Proceedings of the International Conference on New Trends of Development and Models of Reform in the Field of Vocational Education and Training in the 21st Century (Shanghai, China, October 26-29, 1998).

INSTITUTION Regional Inst. of Vocational and Technical Education, Shanghai (China).; German Agency of Technical Cooperation, Beijing (China).

PUB DATE 1999-04-00

NOTE 159p.

PUB TYPE Collected Works - Proceedings (021)

EDRS PRICE MF01/PC07 Plus Postage.

DESCRIPTORS Academic Education; Business Education; Educational Attitudes; *Educational Change; Educational Objectives; Educational Planning; Educational Practices; *Educational Trends; Foreign Countries; Futures (of Society); Integrated Curriculum; International Programs; Job Training; Models; Postsecondary Education; Program Development; Secondary Education; *Strategic Planning; Teaching Methods; Technical Education; Technology Education; Training Methods; *Vocational Education

IDENTIFIERS China; Germany; Korea; Singapore; Thailand

ABSTRACT

This book contains an introduction and 10 papers from the International Conference on New Trends of Development and Models of Reform in the Field of Vocational Education and Training in the 21st Century. The following papers are included: "Introduction to the Reports Held on the International Conference"; "The Development and Reform of the Vocational Education in China--Oriented toward the 21st Century" (Yu Zuguang); "The Dual System of Vocational Training--Structures--Problems--Prospects" (Hans-Guenter Wagner); "Strategies for Development of Vocational Education and Training in Korea" (Ikhyun Shin); "The Integrated-Technology Teaching and Learning (ITL) Concept--An Effective Approach for Technical Education" (Edward Ho, Evangeline Chen); "The Situation of Vocational Education and Training in Thailand" (Pavanuj Fungladda); "A Technological and Vocational Education Perspective: Past, Present and Future in Taiwan" (Fu Hung Yuan); "Internationalizing Business Education Programs: The Evolving Vision of Education for and about Business" (Kuang Ku Chen); "A Brief Survey of Knowledge Economy and Vocational-Technical Education" (Liu Chunsheng); "The Organization, Focus of Vocational Education Study and Its Impact on the Development of Vocational Education--A Survey Also on the Status, Characters, Functions and Significance of Shanghai Institute of Vocational and Technical Education" (Cheng Yonglin); and "New Trends of Development and Reform of Technical and Vocational Education in the 21st Century: The Outline" (Zheng Junhua). The conference agenda is appended. (MN)

.....

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

.....

ED 431 104

International Institute of Vocational and Technical Education 上海职业技术教育研究所

Proceedings *of*

*The International Conference on
New Trends of Development and
Models of Reform in the Field of
Vocational Education and Train-
ing in the 21st Century*

(held in Shanghai from October 26th to October 29th)

06678770

RIBB

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

- ☒ This document has been reproduced as received from the person or organization originating it.
- ☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND
DISSEMINATE THIS MATERIAL HAS
BEEN GRANTED BY

H. G. Wagner

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)

1

BEST COPY AVAILABLE

2



Proceedings of the Shanghai International Conference on *New Trends of Development and Models of Reform in the Field of Vocational Education and Training in the Transition to the 21st Century*

Published by

Regional Institute of Vocational and Technical Education Shanghai in Cooperation with
the German Agency of Technical Cooperation (GTZ) GmbH

Final Edition

Wang Lan

Language Consultancy

Geoffrey Song

Cover Design

Chi Yi

Distribution

Regional Institute of Vocational and Technical Education Shanghai Hu Tai Lu 520, Shanghai 200065

Printed in the P.R. of China

上海职业技术教育研究所

Regional Institute of Vocational and Technical Education

Proceedings

of

*The International Conference on New Trends
of Development and Models of Reform in the
Field of Vocational Education and Training
in the 21st Century* (held in Shanghai from October
26th-29th, 1998)

Shanghai, April 1999

Contents

Foreword.....	1
Introduction to the Reports.....	3
Prof. Yu Zuguang	
The Development and Reform of the Vocational Education in China - Oriented Toward the 21 st Century.....	9
Dr. Hans-Guenter Wagner	
The Dual System of Vocational Training - Structures - Problems - Prospects -	24
Dr. Ikhyun Shin	
Strategies for Development of Vocational Education and Training in Korea	47
Edward Ho and Evangeline Chen	
The Integrated-Technology Teaching and Learning (ITL) Concept - An Effective Approach for Technical Education	73
Pavanuj Fungladda	
The Situation of Vocational Education and Training in Thailand	84
Prof. Fu Hung Yuan	
A Technological and Vocational Education Perspective: Past, Present and Future in Taiwan	97
Prof. Kuang Ku Chen (Ph.D.)	
Internationalizing Business Education Programs: The Evolving Vision of Education For and About Business	112
Prof. Liu Chunsheng	
A Brief Survey of Knowledge Economy and Vocational- Technical Education	124
Prof. Cheng Yonglin	
The Organization, Focus of Vocational Education Study and Its Impact on the Development of Vocational Education - A Survey also on the Status, Characters, Functions and Significance of Shanghai Institute of Vocational and Technical Education	135
The Outline	152
Appendix: Agenda	

Foreword

From Oct. 26th to 28th, 1998 an international conference on "New Trends of Development and Reform of Technical and Vocational Education in the 21st Century" was held in Shanghai. The conference was organized by the Regional Institute of Vocational and Technical Education (RIBB-Shanghai) together with the German adviser team of GTZ and in cooperation with the Shanghai Educational Development Foundation (for more information about RIBB-Shanghai see the backside of the cover).

The conference had four main subjects and topics:

1. The situation of vocational education and training in the participant's countries (systems, structures, problems)
2. New tendencies of development in the field of vocational education and training
3. Scientific research on the subject of vocational education and training, topics and forms of research and its influence on the actual development of vocational education and training
4. The new challenge of globalization and the response of vocational education and training – chances and limits of international cooperation in this area

Further topics were the role of scientific research in planning and organizing vocational education and training as well as the chances and limits of international cooperation in this field.

Today, the systems of vocational education and training in Southeast-Asian countries are confronted with big challenges. In order to respond to the changes of fast changing labor markets and to adjust human resource development to the demands of economic and social development – and at the same time to protect the traditional values – Southeast Asian countries create different systems and models of technical and vocational education. Facing the challenges of globalization, the conference provided an occasion to exchange some of the practical and theoretical problems resulting from adopting new models of technical and vocational education worldwide, particular in reflecting the experiences in Asian countries. As a result, there should be a deeper understanding of the conditions under which new models of vocational education and training can be implemented and on how

these models can be evaluated and improved.

The target group of the conference was mainly participants from China (mainland and Taiwan), Germany, Korea, Singapore and Thailand, who are involved in different areas of vocational education and training as educators, teachers and officials.

The conference was opened by Mr. Xue Ximin, Deputy Director of the Education Commission of Shanghai Municipal Government.

The moderation of the conference was in good hands by Prof. Meng Guangping, Executive Vice Chairman of the Chinese Society of Technical and Vocational Education, and Dr. Hans-Guenter Wagner, member of the German advisor team of GTZ.

The record of the discussions was kept by Ass.-Professor Guo Yang (RIBB-Shanghai).

On this occasion we would like to express our gratitude to all participants of the conference and to all organizations, for their cooperation and their important contributions to the success of the conference, and also to the staff of RIBB-Shanghai for preparing and organizing this event.

Cheng Yonglin
(Director of RIBB-Shanghai)

Prof. Dr. Peter Lorenz
(Head of the German advisor team)

Introduction to the Reports held on the International Conference: New Trends of Development and Reform in the Field of Technical and Vocational Education in the 21st Century

The International Symposium was held to enable a discourse on some of the new tendencies of the reform and the development of vocational training models in the 21st century. As at this conference both participants and speakers come from different walks of life, the reports and also the discussion reflects the problems of vocational training in the next century from very different perspectives. Besides of researchers in the field of (vocational) education and labour market studies, there are also representatives from educational authorities, planning commissions and monitoring institutions, and last but not least teachers and practitioners from the frontmost row of vocational training. As different as the participants origin, are the corresponding approaches to the conference's subject. Some people consider the perspectives of vocational training in the future from a rather practical triangle and with respect to some current technological changes (as in the field of mechanics and electronics) while others refer to the so called system approach by reflecting on changes likely to occur within the social and economic conditions that have impact on technical and vocational education. The range of the conference speeches therefore comprehends micro considerations as well as macro reflections on the challenges that lie ahead. Despite these different approaches and perspective, there is also a common denominator: The 21st century will be a century of a *learning society*, a century in which - even in the field of vocational training - during the development of one's abilities to the full, creativity, flexibility and new forms of learning play an ever increasing role. To respond to the challenges of the future, technical and vocational education has to undergo deep-reaching and profound changes.

There is a common understanding that reforms and changes in the field of vocational and technical education are inseparably connected with the development of the whole society. As a result, prevailing development tendencies and values of social and economic life have profound impact on the system of vocational and technical education. A holistic approach is required. On the one hand the system of vocational and technical education must correspond and adjust itself to

the challenges of a rapid changing society, but on the other hand, changes and innovations in the area of vocational and technical education contribute at a large scale to the transformation of the whole society. To search for and to identify common aims and ends within this process of interaction is of ever growing importance. During the conference, five country reports and four reports regarding regional developments and special subjects of vocational education and training were presented. The speeches held at this conference contribute from different viewpoints and at different degrees to this important future task.

As a representative of the host country, Yu Zuguang, Vice-Director of the Central Institute of Vocational and Technical Education (Beijing), gives in his speech an outline about the reform and development tendencies of vocational and technical education in the P.R. China since the beginning of the reform and opening policy with particular emphasis on recent developments. He points out, in which way the economic reform policy brought entirely new challenges to the traditional system of vocational education. As result of a far-sighted policy, the Chinese system of vocational education became in the meantime a driving force of reform that boosts the whole economy by accelerating changes and innovations in all parts of social and economic life. Yu describes the reform of the system of school administration and management beside the exposition to new ways of thinking acting as the cornerstones of the whole reform process. He states that curricula and education methods not fitting to the needs of the labour market and a high rate of unemployed young people are the most serious problems today.

Hans-Guenter Wagner, member of the German expert team at the Regional Institute of Vocational and Technical Education (Shanghai), gives a report on some of the current problems stemming from both the general situation of economic globalization and the specific background of the German re-unification which the German system of dual training is now confronted with. To meet the challenges of the coming century, particular those arising from new technological developments and from the new demands of a single European market, Wagner outlines an integrated concept of life-long learning and introduced new procedures and applicable methods in the field of curriculum and training regulation development as well as new ways to create new training possibilities. Both measures of legal enforcement and economic incentives should be combined used to lead companies

to provide more training places. In the future, there are not only technological challenges, but also the need to stop the destruction of the natural environment and modelling the relationship of men and nature in a more harmonious way. Therefore, he also stresses the growing importance of environmental learning in vocational education.

In his report on "Strategies for the Development of Vocational Education and Training in Korea", Ikhyun Shin from the Korean Research Institute for Vocational Education and Training after describing some important changes in the industrial structures in his country and some corresponding fluctuations in the workforce, put forward the thesis that these changes will finally result in a service oriented and knowledge based economy, in which the world of work will radically changes producing a wide range of diversified and specialised jobs which need more knowledge and creativity. To respond to these challenges, Ikhyun Shin asks for a farewell to some old Asian traditions: job skills should enjoy higher esteem than academic achievement. Vocational education and training has to change its focus from knowledge and theory bounded training to a higher emphasis on job performances. Concerning the administration of a system of vocational training and education, he pleads for a decentralisation of decision and policy making. The implementation of organisational models based on a partnership between industry, academics and the government should be enforced.

Edward Ho from Nanyang Polytechnic Singapore gives a report that consists of two different parts. In the first part he shows that in spite of the rather short history of organised vocational education and training in Singapore, the system of vocational education and training has already made tremendous contributions to foster high rates of economic growth, which - at least at this degree - had not been possible without even this basis. To show in which way vocational education and training still strives to meet the ever changing needs of the industry, in the second part of his report, Ho chooses the mechatronics industry as an example to demonstrate how the three dimensions of technology oriented learning, value-added engineering oriented learning and solution oriented learning can be integrated into an comprehensive teaching and learning environment where multi-disciplinary technology can be studied at multiple levels. He particularly stresses the high value of a suitable learning environment, where multi-disciplinary technology can be integrated to simulate real life conditions or for other purposes. In such a kind of integrated teaching and learning

environment, learning becomes easy, enjoyable and effective, especially those of multi-disciplinary technology. (The written version of Ho's report was submitted as a co-author with Evangeline Chen.)

An overlook about the situation of vocational education and training in Thailand was given by Pavanuj Fungladda, director of the Nonthaburi Center for Skill development, in her report. Among others, the lack of labour market information, of a job placement system, of training quality assurance as well as the lack of working or industrial habits, she described as the most serious problems of vocational and technical education in Thailand in the transition to the new century. To meet these challenges and to adjust to future developments, scientific research plays an important role in planning, running and evaluating vocational training programmes in Thailand. Besides that, many efforts are taken to promote and encourage small and medium industries to provide more training opportunities. Through the establishment of company based training centres and private training institutions and by other means, the private sector is encouraged in developing skilled labour. Particular emphasis is put on the job qualification of women to ensure an equal status for them in society.

"What kind of education, for what purpose, and for whom?" is the key question for Fu Hung Yuan in his report on the actual situation and the future development of vocational and technical education in Taiwan. Although the current vocational education system in Taiwan originated only in the fifties, it contributed considerably to the islands constant growth and expansion in industrial, business and other trade areas. To keep pace with changes taking place in the world of work, the system of vocational education and training, so Yuan, has to become much more flexible to react to a rapidly changing job market. Young students have to be prepared to be more adaptable and to respond quicker to the requirement of new technologies. At the same time, retraining of the jobless and for new job performances gains importance. As Yuan sees Taiwans future in a society of high tech, vocational education should become more general and flexible. To prepare students for a career in a world of change and challenge, a more flexible and general education becomes more important than just a training for a first level job.

Kuang-Ku Chen, another participant from Taiwan, selects the field of Business Education to show how the economic globalization fosters an education for the global marketplace. Education concerning globalization, so his demand, should already begin in elementary

schools and continue on a lifelong basis, with business education making contributions at all stages. New strategies of learning like international cooperative education, work experiences abroad and cross-cultural communication skills can help the student to both job specific skills and broad, transferable attitudes, skills and knowledge necessary to work successfully in a global marketplace. Chen promotes the concept of an comprehensive International Curriculum Standard Model, which contains a wide range of interrelated subjects. Knowledge, attitudes and applications are the core of this model, surrounded by a various curriculum areas. Chen considers knowledge and skills in the basics of business indispensable for every student in the future, in order to attain tools for personal and professional success.

Knowledge is likely to become the most important resource in the future, and vocational education and training is one of the main provider of this resource. Liu Chunsheng, professor at Tianjin University, discusses in his speech some of the consequences of increasing knowledge productivity for modelling the system of vocational and technical education. Referring to the model of an information society and Knowledge Economy as brought up by Bell, Toffler and others, Liu concludes that as far as society increasingly relies on information, science and technology, education will become the heart of a Knowledge Economy and be the prime means of creating and disseminating knowledge as well as for cultivating advanced professional specialists. This a general world-wide tendency. But in China, where more than 50% of the industrial equipment is outmoded, there is still a long way to a knowledge determined industry. Liu therefore argues against overemphasising higher education and ignoring secondary education. To neglect secondary vocational education would be particular irresponsible and harmful. The development of innovative and pioneering ability is today one of the best preparations of the future Knowledge Economy, so his conclusion.

The organisation of scientific research in the field of vocational education and training is the theme of the report of Cheng Yonglin, director of the Shanghai Institute of Vocational and Technical Education. After describing how the reform and opening policy also opened doors to new and fruitful research activities, he chooses the RIBB Shanghai as an example to demonstrate, how via pilot projects in vocational school and training centres and in cooperation with other relevant partners and by further means, research institutions successfully accomplish research tasks given by the government and

other institutions. He also showed in which ways research results are then to be applied by the educational policy making departments, in curriculum making or at school or company level. The value of this kind practical and empirical research, according to Cheng, can be assessed in its social and economic effects. In a faster popularisation of research results, an increased exchange of experience and information between different forms of research and research institutions as well as in the strengthening of international exchange and cooperation, he sees some of the demands to make research more effective in managing vocational and technical education.

Meng Guangping and Hans-Guenter Wagner alternately presided over the three days of the conference. After each presentation, there were excellent exchanges between participants and presenters which were vividly continued during the informal sessions. The summary of each discussion can be found in the appendix of the corresponding reports. The third day was exclusively reserved for discussion and exchange. The participants discussed a wide range of topics concerning new developments and the future challenges in the field of vocational training in various countries with special regard to the situation in South-East-Asia. Topics of interest included new strategies to respond to changes of fast changing labour markets and new concepts of how to develop human resources in a world of accelerating economic and social change. Particular emphasis was put on the role of scientific research during the processes of implementation and supervision of vocational training programmes as well as on the issue of environmental education in vocational training. There was a common understanding that Vocational Training should not only react to developments happened in past, but that it should play an active role in predicting future developments and create appropriate vocational training programmes to suit new developments in advance. There was also general emphasis on the acquisition of basic knowledge and basic skills so as to upgrade the flexibility and re-trainability of the trainees and students. The role of Vocational Training in addressing the unemployed and the importance of practical learning, particular the value of in-company-training, was also brought up by many participants.

Hans-Guenter Wagner

Country Report China

Prof. Yu Zuguang

(Central Institute of Vocational and Technical Education)

(translated from Chinese into English by Zheng Junhua)

The Development and Reform of the Vocational Education in China - Oriented Toward the 21st Century

1. Situation of Vocational Education

1.1 General situation

After the promulgation of *the Compulsory Education Law of the People's Republic of China*, the nine-year compulsory education was put into practice. By the end of 1997, the nine-year compulsory education has benefited 65% of the whole population, 98.92% school-age children have been admitted to primary schools; about 87.1% primary school graduates can enter junior middle schools (hereafter JMS); the promotion rate of JMS graduates is about 51.5%;¹ the average promotion rate of senior middle school (hereafter SMS) students is 37.1%. (The total admission of general colleges and adult colleges versus the overall graduates of senior middle schools and adult specialized secondary schools.) Since the overall school capacity in China is far from sufficient to meet the demands, we have to face the problem that more than 1 million primary school graduates, 7 million JMS graduates and over 1 million SMS graduates can not enter schools of higher level. In order to solve this problem, we have adopted the policy of "distributary in three levels" in education. According to *The Outline of Reform and Development in Education of PRC* issued by the State Department, the distributary in three levels, for graduates of primary schools, JMS graduates and SMS graduates should be well planned and carried out, the development of Vocational Education (hereafter VE) should be enhanced, a co-developing and inter-connecting educational system with good proportions of different ingredients, which include general education and vocational education

¹ *The 1997 Annual Report of the Statistics On the Development of Education*, the SEDC, (the State Education Commission) *China Education Daily*, April. 13, 1998

at all levels, should be established gradually.

Now, a VE at three levels, primary, secondary and higher, has been established by and large. The statistics in 1997 are displayed in the following table.

The general situations of VE development of all types at all levels in 1997²

	Number of schools	Graduates	Admission	Enrollment
		(in 10 thousand)		
Short-cycle Voc. Univ.	80	2.98	4.47	11.21
Specialized Sec. schools	4,143	115.71	162.11	465.41
Schools for Skilled Workers	4,395	69.94	73.40	193.10
Voc. Senior Middle Schools	8,578	129.17	180.34	431.00
Voc. Junior Middle Schools	1,469	20.93	30.88	80.89

In the year of 1997, besides those 1,469 Vocational Junior Middle Schools with 809 thousand students in China, there are other forms of primary VE education, including "three plus one" (three years of general JMS education plus one year of VE training), "distributary in the second year of JMS" and infusing VE element into general JMS education. Also in the year of 1997, the total number of Secondary Vocational Schools (including Specialized Secondary Schools, Schools for Skilled Workers and Vocational Secondary Schools) is 17,116, 3.6 times the figure of 1978, the total enrollment is 10.89 million, 8.6 times that of 1978. In 1978, 7.6% students in secondary schools were receiving VE, now the proportion is 56.2% in 1997. To meet the demands brought forward by the development of science and economy, higher vocational education emerged. Now, there are 27 vocational technical colleges, 73 vocational universities, 3 senior technical schools and 14 specialized secondary schools with five-year higher vocational training programs in China. Besides, some specialized senior schools and adult universities are experimenting higher vocational education.

In 1997, the total admission of adults in technical training school of all types is 71.23 million, where the students are receiving different kinds of technical and vocational education (hereafter TVE). 2,800 job-training centers which are under the supervision of labor ministries of all levels have the capacity to train 3 million people each year. 20,000

² *Annual Report of Vocational Education in China, 1997*, Central Institute for Vocational and Technical Education, Department of Vocational and Technical Education, State Education Ministry of the PRC.

worker-training centers which are set up and supervised by enterprises have the capacity to train 30 million people each year.³

1.2 The functions of VE in the social and economic developments

- **Developing in phase with the fast-growing economy.** The reform and development of VE is urged by the fast-growing economy and the industrialization process in this country. Take the secondary VE, which occupies over 90% of the total admission and enrollment, as an example, from 1980 to 1997, its enrollment grew from 2.263 million to 10.895 million, 4.8 times the original number. In the same period, 30.85 million graduates from secondary VE schools entered the working class, 4.5 times the number of all graduates in 30 years after the founding of the PRC. It should be pointed out that secondary VE develops in phase with the economy in this period. If we count the GNP of 1980 as 100 with the total enrollment of secondary VE schools also as 100, then in the year of 1995, GNP is 428 with the total enrollment 415.⁴
- **Adjusting to the workforce management system (hereafter WMS) reform.** The reform in the field of WMS started from the beginning of the 80's in China. The "trinity" policy was adopted in WMS. This policy combines three ways of employment-seeking together - seeking employment with the assistance of labour ministries, seeking employment in groups and seeking employment all by oneself. Then the training-employment policy of "training first, employment second" was adopted. Vocational senior middle schools and short-cycle vocational universities adopted the new employment policy from the first day of their operating, with no government employment plan to seek help from. The reform of admission-employment system was started gradually in specialized secondary schools and schools for skilled workers. As being decided in the document issued by the CPC Central Committee in 1993, - *The Decisions on Several Problems in the Process of Setting up Socialist Market-Oriented Economy Mechanism*, "the workforce management system should be reformed, while the labour market should be constructed

³ *Labour Force Market Development and Employment System Reform*, by Zhang Xiaojian and Liu Kang, *Research Reports on the Vocational Education of PRC*.

⁴ *The VE Reform In the Period of Economic Transformation of PRC*, by Yang Jingtu, *Research Reports on the Vocational Education of PRC*.

gradually." This decision quickened the pace in the constructing of the labour market. In 1998, all the graduates of specialized secondary schools will seek employment in labour markets, instead of waiting for the government employment plan.

- **Setting up a multi-sponsored school-managing system to coordinate with the reform of economic mechanism.** In the overall expenditure of VE in 1997, state-budget occupies less than 70%, non-state-budge over 30%. In some vocational schools that advance ahead in the process of reform, non-state-budge occupies over 50%. The increase of self-raising fund in educational institutions symbolizes the setting up of a multi-sponsored school-managing system. In 1997, the total enrollment of vocational senior middle schools run by the local people is 177 thousand, and 4% of the enrollment of vocational senior middle schools run by the state. The development of education institutions run by the local people symbolizes both the break-through in the solely state-run educational system and the establishing of training market. This development also introduces the concept of market competitiveness and people-running mechanism into the educational system. Now more educational resources can be used, and the forms of VE can be diversified. With the contribution of the educational institutions run by the local people, VE can satisfy the social demands of various types and at different levels.
- **Being the main ingredient of the educational reform in rural areas.** Since the 1980's, the educational reform in rural areas has been centered on the main objective of "enhancing the development of agriculture through science and education." A series of reforms aiming at "combining agriculture, science and education together" and "planning three forms of education as a whole - general, vocational and adult education" have been implemented. In these reforms, the rural vocational schools and vocational training centers played a very important role. A large number of model institutions come into our sight. Some of them are, Pingdu City of Shangdong Province, Qian'an County of Hebei Province and Shaoyang District of Hunan Province.
- **Restructuring secondary VE, establishing a new VE system.** The development of primary VE contributes a lot to the training for the labour-force in underdeveloped rural areas and the popularization of the compulsory education. The development of

secondary VE enriches the functions of the secondary education. The development of VE at the senior middle school level, on one hand, satisfies the social demands for more educated laborers of primary and secondary levels in the process of economic development, improves the overall performances of laborers, on the other hand, eases the pressure on the higher education which lacks sufficient capacity to admit so many senior middle school graduates, helps to maintain the social stability. Higher vocational schools admit the graduates with relevant specialty from vocational middle schools. Through the admitting of graduates, the communication and connection between vocational schools at these two levels have been enhanced. The development of higher VE plays an active role in leading the development of primary and secondary VE. It has also been proved to be a successful attempt of higher education to adjust itself to economic and social development.

2. To Meet the Challenges of the New Century

2.1 The economic and social background of VE's development

China has been developed rapidly for twenty years since our government adopted the Reform and Opening Policy in 1978. From 1979 to 1997, China's GNP per capita grew from 379 to 6,079 RMB. With the price rise taken into consideration, the net annual growth rate is 8.4%. The exportation grows 52% each year. In this period, the net annual income for each peasant/farmer reaches 2,090 RMB, and that for each town inhabitant, 5,160 RMB. With the price rise taken into account, the net annual growth rate is 8.1% for peasants, 6.2% for town inhabitants. Now, people living in China have reached 80% of the goal of Well-to-Do Life. The overall living standards are close to this goal.⁵ From now on to the year of 2010, China will establish a fairly perfect socialist market economy system, keep the continuous, rapid and healthy development of the national economy, and reach the goal of industrialization by and large. Due to historical, natural and geographical reasons, plus the differences caused by the delaying of reform and opening in certain places, different regions in China do not develop on the same level. In the past 19 years, the contribution of the middle region to GNP decreases from 31% to 27.5%, the west region,

⁵ *Reform, Opening and Developing*, National Statistics Bureau, *China Information Daily*, Sept. 23, 1998.

from 16.5% to 14.1%. In the same period, the contribution of east part grows from 52.5% to 58.3%. The difference in GNP per capita for different regions is more shocking. The net income of each town inhabitant in Guangdong Province is 2.4 times that in Inner Mongolia Autonomous Region. The average net income of each town inhabitant is 2.5 times that of a rural counterpart.⁶ The developed regions and cities can reach the objective of national economic and social development 10 years ahead of the plan. For underdeveloped regions and rural areas, at least 10 more years is needed. At the turning-point to a new century, science and technology are advancing rapidly, Knowledge Economy is emerging as the new force, the competition among nations are getting more and more heated. With the immense regional differences, China's VE has to meet new challenges.

2.2 The challenges to VE in the new century

- **Great demand of quantity.** First, the demand of new laborers to vocational education and training should be taken into consideration. In the period of the ninth Five-Year Plan, 72 million new laborers (18 million in towns, 54 million in rural areas) entered the labour market, or 14.4 million new laborers each year. About 1 million of them graduate from higher schools each year, other 13 million people need vocational education and training at different levels. Suppose half of them want to receive secondary VE, the total number would be 6.5 million, 1.56 times the total admission in 1997. Besides, the Ministry of Agriculture is implementing in rural areas a plan named "Green Certificate", which requires every one family out of 20 become the holder of Green Certificate by the year of 2000. That means the number of Green Certificate holders should increased from 1.5 million to 10 million. The training task for each year should satisfy the demand of 3 million people in the coming three years, each learner should have 300 hours of learning. Since 80% laborers in the construction fields are from the surplus workforce in rural areas, the Ministry of Construction plans to popularize vocational training for the construction workers. It is required that by 2000, 40% construction workers should have received relevant vocational training and education. Now, let's turn to the demand of the working-age young people. Statistics show that as the young people born in the "baby

⁶ *Reform, Opening and Developing*, National Statistics Bureau, *China Information Daily*, Sept. 23, 1998.

boom" are entering middle schools, 14.63 million people graduated from general and vocational junior middle schools in 1997 with the promotion rate of 50.47%. Given a calculation cursorily, if the promotion rate increases one percent annually, the total admission of senior middle schools (including secondary vocational schools) should be 9.77 million in 2000, 1.32 times that of 1997; 14 million in 2004, 1.9 times that of 1997. Suppose 56% of this number goes to vocation schools, the total admission and enrollment of secondary vocational schools should increase 10% annually in the coming seven years.

- **The increasing demand of quality.** With the advancing of technology, reforming of the employment structure, reforming of the industrial infrastructure and the pressure of international competition, enterprises want to recruit graduates with better performances and competencies. The quality of VE should be improved accordingly. The students and their parents are obliged by the heated competition in labour market to seek vocational schools with better teachers and learning environment. The competition in admission among vocational schools raise the requirements for a school's reputation and the success of its graduates in labour market. The young people in the new century may want to live a decent life in rural area, or want to get a career with prospect in cities, or have to shift from one post to another, or need further education. Their demands also call for the improvement of the quality of VE. In market economy, quality is the key to success. A vocational school can not get upper hand in market competition without good quality. In the 21st century, the shortage economy will come to its end. Quality instead of quantity will be the focus of people's attention.
- **Diversified demands to VE.** In market economy, vocational school managers are not limited to government agencies. Different trades, enterprises and individuals have different requirements for levels, types and forms of VE. The change in labour market also shows its impact on people's requirement to VE. Today a teenager is mostly the only child of his or her family. Youngsters and parents have diversified demands for levels and types of VE. VE has been endeavoring to multiply its levels, types and forms to meet the diversified demands, but there is still a long way to go. The simple and uniformed school-managing model set in the period of planned economy has not been transformed

fundamentally. The primary VE urgently needed in rural areas, the higher VE required by developed areas, post-senior-middle-school VE required by certain industries, comprehensive senior middle schools covering both general education and VE, adult technical training programs, and different training programs aiming to certificates, will be the leading sections in the development of VE.

3. Problems in Vocational Education Development

3.1 Pressures without

- In the period of economic transformation, the industrial infrastructure is in the process of reforming. Fewer and fewer graduates from vocational schools can find satisfying jobs which provide them with the opportunities to use what they have learned in schools. Many of them become "underemployed". The problem of "supply and demand" in labour market becomes more and more serious. With the approaching Knowledge Economy and fast advancing technology, the existing curriculum and contents of VE can no longer satisfy the demands in the new century. Some specialties need to be technology-oriented.
- With the reform of the government agencies, more and more agencies give up the supervision over vocational schools. Now the problem is that some secondary vocational schools are "nobody's baby". The government stopped taking care of the secondary vocational school graduates in job-hunting in 1997, as a result, in 1998, these schools are facing the problem of admitting students. The reform of state-run enterprises is in a critical moment, so the vocational schools managed by these enterprises are "in hot waters". They can not enlarge their admission. Other vocational schools that used to be guided by government agencies, now due to the reform of the government agencies, are getting somehow "lost" in their way. Besides, enterprises today are reluctant to open vocational schools. In some regions, attention is not paid enough by the public to the development of VE.
- The growth rate of national economy is smaller than that of population, so in labour market, supply will be exceeding demand in a long term. The enterprises today are endeavoring to reduce the manpower and increase the profit, so lots of workers get "laid-off"

in cities. To make things worse, the surplus labor force in rural areas is seeking opportunities in cities. Now, economies of multiple ownership are co-developing, so the old concept of "government takes care of everything" should be abandoned. It is not surprising that today's vocational school graduates can not find satisfactory jobs easily. Some of them are still waiting for the assistance from the government. It takes a long time and lots of efforts for them to accept the reality and get ready for the competition in labor market.

3.2 Problems within

- The infrastructure, allocation of resources, quality and teachers of VE can not guarantee the success in fulfilling the great task assigned to it. The size of VE enlarges very fast recently, but the teaching condition improves very slowly. The problems of insufficient investment and poor teaching conditions stand out.
- The guiding principle, specialties, curriculum and teaching strategies of VE can not respond to the demand from labour market in an advancing society, can not provide students with enough opportunities to develop in every aspect.
- The system of VE is far from complete. The types and levels of VE can not meet the demands. Primary VE is not fully developed, so those students who fail to enter higher schools have not enough opportunities to receive vocational training before they start to work. Secondary VE is too uniformed, and students do not have enough choices. Higher and post-senior-middle-school VE develops too slowly, and some of the secondary vocational school graduates and those who fail to enter colleges have nowhere to learn skills.
- The market mechanism starts to function, but the market is far from mature. The problems are: information service is not satisfying; the setting up of specialties, curricula needs to be codified; the admission policy should be standardized; the proportions of different kinds of vocational schools should be well-planned; the development of relevant social service system can not meet VE's demands; government guiding and planning can not respond to the fast-changing situations.

4. Plan for Reform and Development

The comprehensive goal of our reform is: guided and planned by the government, on the basis of a multi-sponsored school-managing system contributed by different trades, enterprises and institutions, oriented by the demand of labour market and vocational education training market, while supported by a comprehensive vocational education service system, and supported by the policies of the governments of all levels, a new vocational education system should be developed to respond to the developing socialist market economy.

4.1 The reform of school-managing system

"Vocational Education is a very important ingredient to national educational system, and it contributes a lot to the social and economic development and workforce management system." VE benefits both the country and people. Developing VE is not only a task of the government, also a task of different trades, enterprises and individual students and their parents. According to the Vocational Education Law of the People's Republic of China, the cost of VE should be shared among all the parties that benefit from it. VE should raise its fund with the contribution from governments of all levels, relevant trades and enterprises and the students. We should spare no efforts to seek every possible resource of investment. The resource of investment should not be restricted in certain trades, or certain government agencies. Every potential investor should be encouraged, and every sum of investment should be made full use of. When we are making policies concerning VE, we should always put in the first position the importance of multi-sponsored school-managing system.⁷

In market economy, VE has to respond to the demands of government, trades and individuals, so the school-managing system has to be a multi-sponsored one. Each sponsor, driven by his own interests and maxims, may influence the development of VE in his own way, so the sponsors of the managing body should be balanced and harmonized. In the past, government ordered enterprises to open vocational schools in order to ease the pressure on society. From now on, this will never happen. In the past, students and their parents did not have to share the cost of VE, and they did not have to worry about the future, in this

⁷ *Open Our Minds, Probe Into the Unknown*, Hu Ruiwen, Educational Research Reference, Volume 4, 1998

connection, they did not have to make their own choices. Now, facing the broiling competition in labour market, they have to "weigh and balance", choose the vocational school of the best quality and specialty with a bright future. In the past, vocational schools did not have to raise fund for themselves, did not have the risk of admitting students and sending graduates to labour market. But today, driven by the pressures within and without, they attach their managing power with vital importance. Whether they can adjust themselves to both job and training markets, whether they can build up good cooperation with enterprises, whether they can meet the demands of students and their parents, the three questions decide the future of vocational schools.⁸

We must stick to two principles in the reform of school-managing system: first, experiments should be encouraged, comments permitted, disputes avoided. Second, the criterion of the reform is that it should meet the demands of the people and enterprises, and it should improve the quality of VE. The reform, guided by liberal mind, should break through the restrictions of the old, rigescent system. The government should co-operate with trades, enterprises, schools and students. The policies implemented by the government should concern the interests of both the state and the people, not either of them. The rights and demands of the people for better education should be respected and satisfied. The allocation of schools and structure of specialties should respond to the market demand. The demand and desire of each sponsor of the school-managing body should be respected in accordance with government regulations and plans. If we want to make trades, enterprises and individuals active contributors to VE, their interests must be protected. The successes in some regions are the best proofs. These regions are successful in school-managing system reform, and they recombine the resources for VE development with the contributions from communities and enterprises.

4.2 Consummate the market, utilize the market mechanism

The new system has it own mechanism:

Firstly, the development of VE should be demand-oriented instead of supply-oriented. It should meet the demands of both enterprises and individuals. These demands are not restricted to quantity only, more

⁸ *Approaching The New Phase Of The Reform In The School-Managing System*, Tang Yizhi, *Vocational Education Communications*, Vol. 4, 1998

importantly, they are the demands of better structure and higher quality. Challenges can be opportunities. Vocational schools should "solve their own problems, improve their quality" instead of complaining against the indifferent attitude of some enterprises and individuals toward them.

Secondly, vocational schools should be guided by the supply-and-demand information from the market instead of the decrees from the government. Every party's decision, (the party may be an individual, an enterprise, a trade or even a government agency,) should be based on the market information and valid consultancy. Modern VE relies on VE research centers and information service system.

Thirdly, the regulating mechanism is based on the combination of the dynamic adjustment of the market and the macro-control of the government, instead of on the static government plans. Since VE is closely connected to the economy, when the economy fluctuates, VE may respond to it. We should not be over-alarmed to this phenomenon. Of course, the relative stability of VE should be maintained.

Fourthly, the co-ordinating mechanism should play its role with economic relations and laws as its instruments, not government orders. On the one hand, social contracts (laws, regulations) should be promulgated, and education should be managed by law. (We may take the success of Qingdao City as a good example.) On the other hand, economic contracts should be signed, different parties, driven by their own interests, contribute to the development of VE. (Shaoyang Vocational School set up a practice base, which is connected to relevant government agencies, units and parents through economic contracts. These contracts set the responsibility, right and interests of each party.)

4.3 Reform the teaching strategies and improve the quality

Firstly, the core of the teaching strategy reform is to renovate our guiding principle aiming to improving the students' comprehensive ability. In the document, *Proposals for Vocational Education Reform Oriented Toward the 21st Century*, issued by the Ministry of Education in 1998, a new model of comprehensive professional competencies and comprehensive quality was put forward. The comprehensive professional competencies include professional ability, analyzing ability and social ability. The comprehensive quality includes psychological quality, moral quality, cultural quality, technological

quality, and willpower quality.

Secondly, we must go to the enterprises to gather information, keeping us aware of the changes in labour market and enterprises' demands for specialties. The specialties and curricula should be arranged accordingly. The technology applied to VE should be updated. The setting up of vocational certificates should reflect the demand of market. The students should be equipped with solid professional foundation and cultural foundation, so as to be adaptable in the future, and be able to transfer from one job to another.

Thirdly, the quality of teachers should be improved, the existing model of specialties and courses should be readjusted, more investment should be used to improve the practice and laboratory equipment, more emphasis should be put on practice in order to equip the students with full competencies.

Fourthly, VE should respond to the changes in production and service. It should stick to the principle of "combining production and education together" and the principle of "connecting schools and enterprises together." Representatives from enterprises should take part in the whole process of training, especially when the training plan is being drafted, or the quality of a plan is being evaluated. Vocational schools should not be "ivory towers".

4.4 Government planning and managing

Government should co-ordinate with different sponsors of VE managing system. It should not exert too much influence directly on VE. We can learn something from the practice of Qingdao City and Ningbo City. In these two cities, governments gathered "managing fee" from school-managing enterprises, but the governments returned this sum of money to the enterprises in form of "fund for the co-operation projects between schools and enterprises". So enterprises and trades became active contributors to VE in the two cities. In this way, responsibilities, rights and interested are all taken into consideration. This is a "sustainable policy". The roles of government also include standardizing the admitting policies, providing consultancy and service for graduates in job-hunting, supporting the development of backbone vocational schools, readjusting the structure of specialties, improving the allocation of teaching and training resources, strengthening the cooperation among different trades and government agencies, planning

the standard checks on technological levels, etc. Since the labour market and training market are not mature, and most of the trades and enterprises are in difficulties, the role of the government is very important, it should be strengthened instead of weakened.

[Summary of the Discussion]

Qian Jingfang: When we are talking about the plan for the reform of VE, we should take the regional differences of China into consideration. So when we formulate the national policies, we should apply different strategies in different regions.

Yu Zuguang: The state government has shown its concern over this problem. The Minister of Education proclaimed that the regional governments would be authorized to formulate policies of their own characteristics.

Fu Hung Yuan: Has the nine-year compulsory education been popularized in rural areas of mainland China? More than 80% people inhabit in rural areas, and cities develop faster than rural areas. The gap between the two is widening. How should education deal with this problem?

Yu Zuguang: The nine-year compulsory education only benefits 65% of the whole population today. It was originally planned that 85% of the whole population should benefit from it by the year 2000. The goal is impossible for us to reach. The CPC Central Committee just held a plenum with the reform in rural areas as its subject. In this plenum, the nine-year compulsory education became one of the central issues, and in the same plenum, VE in rural areas was also paid much attention. Now VE in rural areas needs to develop faster to narrow the gap with urban areas.

Fu Hung Yuan: The workers in mainland China also enjoy the two-day weekend. How do schools make use of this extra free time? Two-day weekend raises the problem of maintaining social order, also it requires a better-developed social service system. How does VE react to the new situation?

Yu Zuguang: People in mainland China have been enjoying the convenience brought by two-day weekend for quite a long time. It

really quickens the pace of working days. Today, many people use the extra free time to learn something new. In the past, factories used to carry out training programs on weekdays, now, they use the spare time.

Country Report Germany

Dr. Hans-Guenter Wagner

**(Permanent consultant to Regional Institute of Vocational Training,
RIBB-Shanghai)**

The Dual System of Vocational Training - Structures - Problems - Prospects -

1. Main Characteristics of the Dual Systems

1.1 The importance of practical oriented learning

In the German dual system, practical vocational training is mostly given at work backed up by theoretical learning in vocational schools. This kind of training helps the trainee work on his own and at the same time promotes his or her sense of responsibility. Both qualifications are essential ones in developed countries, because they enable the trainee to experience the success of its efforts and to realise the evidence of those knowledge and skills he or she has to acquire in order to perform tasks successfully. The training of people in a practical working environment promotes their self-confidence as well as a positive attitude toward work, motivation and social behaviour. In the dual system, practical training is backed up by theoretical learning as well as by further general education provided in vocational schools that the trainee has to attend regularly during the time of apprenticeship. Thus, the dual system provides both simultaneously: learning in the protected environment of vocational school and learning under the "real-life conditions" of an office, a warehouse or a workshop. As a result, trainees who finished dual training normally are able to adjust themselves to the various requirements of different workplaces as soon as they start their post-training company career. Vocational training in the dual system is therefore less impractical than those forms of training which are mainly school based.

1.2 Close connection between theoretical learning and practical training

In the dual system, vocational schools and companies cooperate in partnership to provide vocational training and education. Most of the

German vocational schools are "part-time" ones which accompany in-company training. Besides of that, they provide general compulsory education to students under the age of 18. There is a higher ratio of instructions given on occupation-related subjects like mechanics, electronics, business or agriculture than those on general education subjects like German, foreign languages, religion or social studies which account for less than 50%. Instruction is mostly given one or two days a week, but for occupations with only a small number of trainees it is also provided in segments of one or more weeks. There is a general division of tasks between firms and schools in such a way that while the vocational school focus on interdisciplinary qualifications and theoretical education, the companies provide partial practical training like concrete working skills and chances for hands-on experimenting. The indirect cooperation between schools and companies comes from the fact that the curriculum and general training plan of both has to be coordinated and harmonised. Direct cooperation occurs in various forms: practical trainers and school teachers should consult each other regularly and work together in the so-called competent bodies which are responsible for the examinations. Some companies invite teachers to participate in in-company training programmes or inform them regularly of new technological developments. Today, 19% of company trainers and 15% of school teachers are involved in joint working groups.

1.3 Coordination and harmonisation between companies, vocational schools, chambers, unions and other workforce representatives

In Germany's dual training system, training contents are allocated between training employers, vocational schools, chambers and workforce representatives. The responsibility for concrete training activities is therefor divided into different training locations. On the system level, the in-company training, on one hand, is determined by laws and regulations of the Federal Government, while contents of school learning on the other hand are regulated by school laws of the Laender. This institutional responsibility is originated in the constitutional situation in Germany where the roles between the Federal Government and the Laender are divided in such a way that the former is responsible for vocational training in companies and the latter are responsible for the vocational schools. On the Laender level, there is a Standing Conference of Ministers of Education and Cultural Affairs which tries to harmonise the interests of all the Laender. In

Federal Government, the Federal Minister for Education and Science is responsible for basic guidelines and coordination, while other ministries and governmental departments are respectively responsible for training contents related to their scope of action. Furthermore, it is a characteristic of the German dual system that representatives of the employers, labours or trade unions and vocational school teachers also share responsibility in developing training regulations, supervising training programmes and holding examinations. On the regional level, autonomous organisations of economy, i.e. various kinds of chambers build "competent bodies" and are organised as public legal bodies whose main tasks are to counsel, check and control the vocational training in the region. For elaboration and harmonisation of new training regulations, guidelines and general curricula, there are both single and joint meetings of Federal Government's expert committees, and committees of the Laender accompanied by Hearings of top representatives of trade or labour unions and those of employer's federations.

1.4 The concept of "profession" (Beruf) according to the historical development of the doctrine of calling

In the dual system, training model is inseparably connected to traditional German concept of Beruf as a life-long occupation. The German concept of Beruf stems from the notion that a once-chosen occupation - might it be priest or basket weaver - should be considered like a divine calling to put ones life into the service of fulfilling conscientiously this task. Thus, in the tradition of the still predominant Protestant ethics, diligence in daily work is still seen by many Germans as accomplishing a religious task, although most people are quite unaware of such subconscious forces lying behind their daily performances. To work conscientiously and responsibly is considered as a basic demand for all kind of work, whether it is skilled or unskilled one and regardless whether it belongs to executive or carrying level. In the eyes of most Germans, a skilled worker with a sophisticated level of craftsmanship always enjoys high social recognition. The legally sanctioning of the dual system as the predominant qualification system in Germany and high appreciation of skilled work and perfect craftsmanship are rooted deeply in the concept of Beruf which can be traced back to the Middle Ages when Protestant ethics arose. Since that time, success in secular affairs became important and was seen as an indication of fulfilling religious duties. Even the origins of vocational training in companies and small workshops go back to that time. A few

centuries later, the religious and trade-oriented Sunday schools in the 17th and 18th centuries became the predecessors of modern vocational schools, which during the 19th century gradually extended the scope by providing more and more general and technical education as well as trade-related courses.

1.5 The concept of a broad basis education followed by a training part of specialisation

Currently there are about 380 recognised occupation requiring formal training. For all occupations there are training occupation profiles available, i.e. a detailed description of the skills and knowledge needed in training. There are mono-occupations with and without specialisation in form of key areas with defined key contents as well as multi-stage training occupation which training regulations consisting of a stage of basic training in the first and specialised training in the second and third year. The later in particular are open models to adjust easier to new developments, which is an important prerequisite for later occupational mobility. In the multi-stage training regulations, the first year of training provides a wide range of basic training courses. During this time, the trainee acquires common skills and knowledge covering a whole vocational field (e.g. metalworking, business and administration, agriculture, textile manufacturing, electrical or building occupations). From the second year onward, there is increasing specialisation finally leads to a certificate in a recognised occupation requiring formal training. For example: people trained in the building and constructing trade learn the same common skills and knowledge during the first year of training, but in the following second and third year, trainees are divided into different occupational directions like brick layer, roofer, well builder, floor plasterer, tile-layer, carpenter and so on. For some occupations, the certificate for the first stage gives the trainee already a qualification useful on the job market. The certificate of the specialist stage, however, provides a young person with a supplementary qualification for additional employment and promotion opportunities. The concept of combined basic training and specialised training is a practical model that has proved its worth in many respects. In contrast to modular and certificate-based models of vocational training which normally only provide very narrow profiles of qualifications, a broad basic education is a useful instrument that gives the trainee a profound understanding of essential needs and demands of the occupation and, therefore, increases flexibility and later occupational mobility.

1.6 Close links of vocational basic education, further training and vocational retraining

As technological innovations and the requirements of modern management force the entire occupational field to undergo profound changes with an ever increasing speed, the notion of learning an occupation followed by many years of practical application is no longer up to date. Thus, accelerating technical developments and new management procedures lead to far-reaching changes in the profiles of qualification, and at the same time create a growing demand for middle-level technical and managerial staff. To keep pace with these developments, further training is necessary to avoid unemployment and to make personal and occupational advancement possible. Learning and practical application should not be separated artificially, on the contrary, working and learning should become one comprehensive unit. In the dual system there is a variety of opportunities for further education and advancement. Basically we have to distinguish *vocational retraining*, *advanced vocational training* and *educational advancement*. *Vocational retraining programmes* are applied in order to provide new qualifications, if there are no longer job opportunities in the trained occupation. It often takes place in inter-company centres. The standards of final examination are comparable to those of young people in the State-recognised occupations. *Advanced vocational training* prepares for higher qualifications like master, technician or middle level commercial clerk. It is offered by various sources as higher vocational colleges, companies, chambers and associations. People attending advanced vocational training courses can therefore attain state, chamber or company recognised qualifications. *Educational advancement* leads to a higher level of general education. The successful attendance of an advanced technical or commercial school, under certain conditions, not only qualifies for high level performances in the chosen field of occupation, but offers a qualification to attend a vocational/specialised grammar school or even a university for applied science (Fachhochschule) by taking a supplementary examination.

2. Basic Structures of the German Dual System

2.1 The place of the dual system within the whole educational system of FRG (the Federal Republic of Germany)

Vocational training in the dual system belongs to the secondary sector of education. Most trainees of the dual system have completed secondary education, i.e. they have attended secondary or grammar schools for 9 to 10 years. There is also a growing number of students who have a general university entrance certificate, but for better occupational change, deciding first to have a practical training in a State recognised occupation. Besides the qualification for an occupation, vocational school provides participants with theoretical and practical instructions in regular dual training programme in an eye of a broader, general understanding of the training subject. The vocational school curriculum also consists of courses like German, social studies, religion, and physical education, which promote the student's level of general education. Apart from part-time vocational schools, there are also full-time vocational schools available for a smaller number of occupations, such as photographer or technical and medical assistant. After finishing 2 ½ to 3 ½ years of dual training course and some time of practical application, there are also opportunities to enter Senior technical or business schools, which apart from advanced vocational training, a restricted university entrance certificate is provided after passing corresponding examinations. The dual system is placed in the overall education structure in this way: Training for a job is not necessarily the final educational level reachable by people without general university entrance qualification, but an extra access to receive higher vocational training and to raise general education level. For this reason, we can describe the dual system as a training and education model with a high degree of "permeability".

2.2 The function of Basic Training regulations - The most important regulations of the Vocational Training Act

For all the State-recognised occupations, there are binding training regulations issued by the responsible Minister, e.g. the Federal Minister of Economics for all kinds of business occupations, the Federal Minister of Health for all kinds of health occupations and so on, with the approval of the Federal Minister for Education and Science. As stated in the Vocational Education Act (Art. 25) the training regulations must at least contain:

- The designation of the occupation requiring formal training
- The duration of training, which may be not less than two years
- A description of skills and knowledge which have to be acquired
- Instructions concerning how to divide skills and knowledge according to subject and time
- The examination requirements

For all dual training programmes, there must be a general training plan standardised for the in-company training in the whole Federal Republic. The General training plan gives exact details on when and in what order the skills and knowledge required for the occupation have to be transmitted in the training companies. On the basis of this binding legal directive for company training, each training company draws up its own training plan according to its own conditions and circumstances. These company training regulations may not fall short of the binding legal directives but, of course, they may exceed the prescribed minimum requirements.

2.3 How are training regulations issued?

The General Training Plan as a binding legal directive for in-company training is an important instrument of standardisation of training skills and occupational requirements within the framework of the Dual system. The standards and rules for dual training are set up with compulsory participation of self-governing economic bodies, particular the chambers. The basic legal conditions for the whole procedure of setting up new plans and regulations is governed by the 1969 Vocational Training Act. According to this, the Federal Institute of Vocational Education (BIBB) in Berlin plays an important role concerning the development of general and detailed training regulations, teaching materials, the running of pilot projects and the supervision of vocational education in general. Representatives of the Federal government, the Laender, the representatives of the employers as well as those of the labour and trade unions cooperate on an equal footing in the Central Committee of the Federal Institute of Vocational Education. They not only give recommendations for further development of vocational training, but also have impact on the institute schedule of activities including budget decisions and the determination of research tasks. Without agreement by all concerned, the Federal Government does not enact binding training regulations.

2.4 The vocational school in the dual system

Vocational schools are the counterparts of the training companies. Vocational education in schools is to promote and supplement the training received in companies by laying theoretical foundations, providing special tuition, and to improve and fill gaps in general technical education. Instruction on special tuition (e.g. technical, business) accounts for approximately 60%, while general education makes up around 40% of the total learning activities. The vocational schools impart vocational qualifications according to the framework curricula which is coordinated with the General training regulations. While Federal laws apply to training received in a company, the school curricula are developed on the level of the Laender. In developing vocational school's framework curricula, representatives of the employers and the unions cooperate with teachers of vocational schools in the competent bodies. After agreement on scope, standards and contents of the framework, new or revised curricula can come into legal force via decree of the Minister of Education and the Arts of each Land. Vocational school instruction normally encompasses 12 hours a week, but according to recent developments, the number of lessons is going to be reduced. Nearly all of the vocational schools are state-run compulsory schools, i.e. it must be attended by all trainees in virtue of the school laws. Due to the different responsibilities, learning in schools and the in-company training is subject to coordination. In order to avoid unequal developments in different Laender, the Standing Conference of Ministers of Education and the Arts functions as an instrument of voluntary self-coordination of the Laender Ministers for this field. This Standing Conference handles issues of cultural policy or inter-regional importance with a view to forming joint opinions and goals. In a federal state based on the principles of diversity, multifariousness and competition, the Standing Conference - where each Land has one vote - shall guarantee the required minimum on uniformity and comparability in the education system of the Federal Republic of Germany.

2.5 Training in companies

German companies are free to decide whether or not to take on trainees. But if they decide to provide training, they are obliged to provide training systematically and subject to certain rules. The period and the content of training are determined by the General training regulations for each State-recognised occupation. Only State-

recognised occupations can become a subject of dual training. According to German law, a training agreement has to be made between company and trainee should at least contain:

- Nature, content and timetable, and aim of the vocational training
- Starting data and duration of the vocational training
- Length of the normal working day
- Length of trial period (which may not exceed 6 months)
- Manner and amount of payment
- Length of holidays
- Conditions under which the vocational agreement can be terminated

According to the law on vocational training, the trainee has the right to receive a payment. The level of payment is negotiated between the employer's association and the trade unions. The payment is raised annually in accordance with age and training progress. Although recently there are some counter tendencies, most of the German companies provide vocational training and are still willing to bear the costs associated with it. In addition to historical traditions and socio-cultural conditions, there are some practical reasons why many companies decide to train apprentices themselves. First, in-company training pays off, because the trainee already produces goods and services and thereby creates added value. Due to later familiarisation, instruction costs can be eliminated or minimised. As a result, there is a positive cost-benefit ratio, which is particular high in supermarkets and small workshops. But cost-benefit ratio is less favourable in the field of industrial production where training mostly takes place in a special training workshop and requires some investments. Second, practice-related qualifications can best be gained in real company situations (learning by doing). Third, many companies are willing to provide training, because a lot of behavioural patterns and personality characteristics required for later professional work can best be developed in company practice. The experience through company socialisation cannot be replaced by theoretical lessons in the vocational school.

2.6 What qualifications people need to be authorised to train

To provide training, companies and individuals must fulfil certain prerequisites. According to the law, a company is only allowed to train people in recognised occupations, if technically and educationally trainers are available to them, who must meet official requirements. Furthermore they must be fully able to impart the subject matter

according to the General training regulations either by their own equipment or training facilities or by means of supplementary training measures in other companies or in inter-company training centres. Qualified trainers are the backbone of the dual training system. They transmit knowledge and skills from one to the next generation of skilled workers. The success of company training relies to a large extent on the availability of qualified training staff. A recognised trainer must fulfil the following conditions:

- A Master's examination (in a technical related occupation) or
- (in all other fields of occupation) a certificate in a subject requiring formal training, and proof of suitability for training and instructing young people by passing an examination of the Chamber which asks for some basic knowledge in the field of practical training and instruction methods, pedagogy and educational theory, and German vocational law, or
- Registration or licensing in the liberal profession (e.g. lawyer or dentist).

The trainer's responsibility covers both the vocational and personal development of the trainee. Besides full-time trainer, there are also a lot of part-time trainers, particularly in small shops and workshops. In total, there are about 700,000 registered trainers in the training sectors of trade and industry, skilled trade, Civil Service, agriculture and liberal professions.

2.7 How inter-firm training centres work

Some firms do not have sufficient facilities of in-company learning or have only restricted individual learning possibilities or they are simply too small in size to completely fulfil the demands of the General training plan. In order, nevertheless, to provide sound training opportunities, there are supplementary training centres. These inter-firm training centers fulfil all the prerequisites for qualified training, if for several reasons a single company is not able to provide conditions according to the standard regulations. Inter-firm training centres provide supplement vocational training, particularly for trainees from small and medium sized companies. In this context, the main purpose is not to replace in-company training, but to compensate for quality differences in in-company vocational training programmes. They impart methods and technologies to the trainees which are part of the General training plan, but owing to the former's nature, the company cannot teach or cannot do so completely. As the equipment in the inter-

company training centres should always reflect the state of the art, these centres function also as institutions which transfer innovations to the companies.

2.8 Financing of vocational training in the dual system

Depending on the nature and task of the institutions involved in vocational training, there are three different ways how financing of vocational training in the dual system is regulated: 1. vocational school is financed from tax revenues, 2. private companies cover the costs of training by themselves and pass these expenditures on the prices of the products and services as far as the market permits, and 3. common tasks, e.g. tasks to be carried out by the competent bodies in connection with apprentice training, are financed by the regular contributions of the respective members. The competent bodies also charges some fees to the training companies for the administration of the vocational training contract and for the holding of examinations. Moreover there are some forms of mixed financing. The investment costs (buildings and facilities) of inter-firm training centres, for example, are covered by the chambers added by subsidies from the Federal Government and the Laender, while the running costs (personnel, materials, energy etc.) are usually covered by contributions of the training companies.

2.9 Costs of a training place

In the Federal Republic each year a total of DM 74,000 million, or 2,4% of the gross national product is spent on vocational training (including further vocational education and training). DM 52,000 million of this money comes from private enterprises. The remaining DM 22,000 is from the expenditures of the Federal Government, the Laender and other State institutions. The following two figures give an overlook on the average costs of a training place in different sectors.

There is a difference between gross and net costs resulting from the fact that in the dual system trainees at different degrees take part in work processes. This kind of productive contribution during the training time brings in profits and thereby reduces the gross costs incurred. As due to the nature of different fields of occupation, the trainees spent different fractions of the training time for productive work, so that the net and gross cost relations vary from sector to sector. Further differences can be detected when the company size is taken into consideration.

Figure 1

Partial cost analysis differentiate
according to sectors

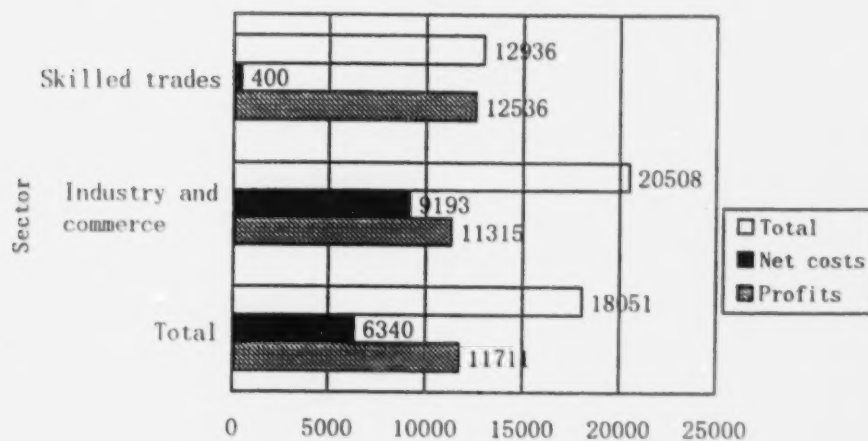
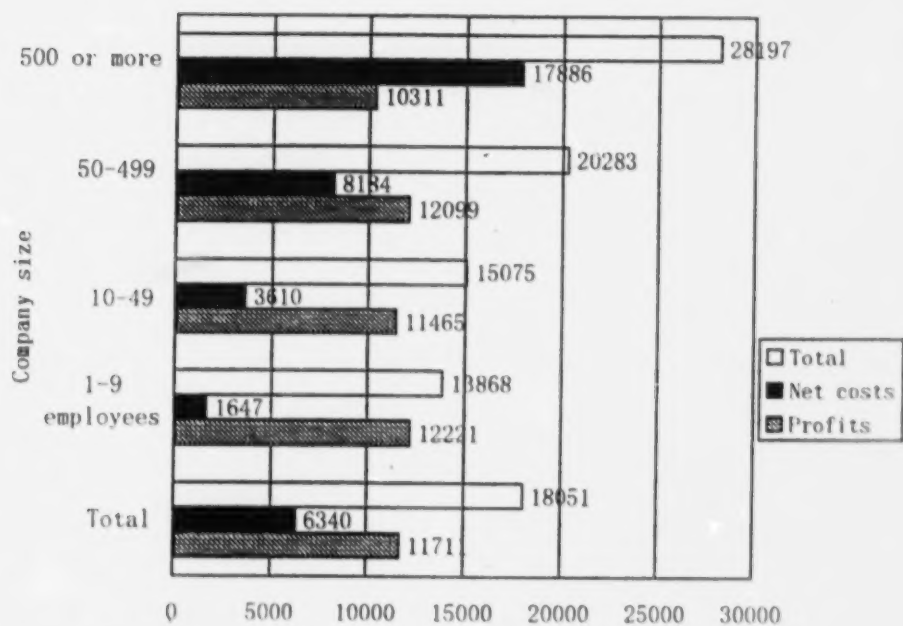


Figure 2

Partial cost analysis differentiate
according to company size



As the second figure shows, companies with more than 500 employees have the highest average net costs for a training place (DM 17,886), while the net costs for a training place in companies with less than ten employees amount to only DM 1,647. The average costs in large-size companies are mainly caused by the high costs of expensive training equipment and training workshops as well as by the reason that they normally employ highly qualified full-time training staff. As both figures show, the net costs in industry and commerce (DM 9,193) are considerably higher than those in the skilled trades (DM 400.--). These figures do not include the costs of the vocational school. An investigation from 1991 (Ministerial Counsellor Dr. Hott, Saarbruecken, cf. Arnold/Muench 1996, p.55) suggests that we can calculate the school costs for a dual system trainee at about DM 3,000 per annum. (All figures from Arnold/Muench 1996, p 54ff).

2.10 Examinations in the dual system

Examinations in the dual system consist of Chamber examinations (interim and final examination) and the School final grade report. In the dual system, the most important examination is the final examination at the end of the period of training. In this examination the trainee has to show that he has acquired the necessary professional qualifications. To hold the examination, the competent chamber establishes a board of examiners consisting of at least three members, being employers' and employees' representatives in equal numbers and at least one vocational school teacher. According to the occupation, the examination consists of a test of practical and/or theoretical skills. Practical examinations will normally call for samples of work or test workpieces. Theoretical tests are conducted as written and oral examinations. Written examinations make use of programmed questions in most cases uniform throughout the Federal Republic. The purpose of the interim examination is to review both the training status of the trainees and the training efforts of the company. Interim examinations are held before the end of the second training year. As the only purpose of this examination is to determine the training status and to indicate in which fields efforts have to be taken so as to pass the final examination, there is no possible consequence of not passing. The interim examination is also held by the competent chamber. Apart from the vocational school examination, the content and procedure of all other examinations in the dual system are in the hands of the competent bodies that have the right and obligation to administer examination regulations in recognised occupations requiring formal

training. They are also responsible for establishing the examination committees. The vocational school grade report plays only a minor role in the dual system, because most companies rely mainly on the final examination certificate issued by the chamber as a selection criterion when hiring employees. The skilled worker's or office worker's certificate is a proof of qualification which confirms not only technical or abstract economic knowledge, but especially practical and occupational skills, and for that reason it is of particular interest to the companies. The vocational school report, however, mainly documents performances in theoretical subjects.

3. Some Current Problems of the Dual System

3.1 Drop of in-company training places owing to technological developments and changes in economic system

Some recent figures indicate a decreasing availability of vocational training places in Germany. The proportion of trainees in relation to the total workforce population went down from 7% in 1990 to 5,6% in 1994. Today, only 30% of all companies provide vocational training. But this figure includes even companies with less than five employees, which count for 60% of all German companies. Apart from the skilled trade, companies of this size normally do not possess the qualification necessary to train young people. If we only consider companies above 10 employees, we get a figure of 50% which provide vocational training. The training rate of large-scale companies (above 500 employees) counts for 94%. But in recent years, even large-scale companies reduced the number of training places by 72,000 or more than 20%. (All figures from the German Annual Report of Vocational Training - *Berufsbildungsbericht 1997* - Federal Ministry for Science and Education, draft, p.9ff). The considerable drop of training places is mainly due to application of rationalisation and efficiency measures demanding strategies against cost explosion. The reasons for the decreasing willingness of companies to provide training primarily have not do to which a temporary downward economic trend, but result from profound technological changes and transformation of the overall economic system. Due to the impact of some technological developments and changes in the economic system on vocational training, a growing number of companies are no longer willing to provide vocational training.

3.2 Problems of developing the dual system in the former East Germany

Some of the current problems are also caused by the integration of the former GDR in the dual systems of the united Germany. Despite all the differences between the political and economic system of the Federal Republic of Germany and the former German Democratic Republic, in the area of vocational training both countries practised a combination of in-company training with simultaneous vocational school instruction. Today, East Germany is still confronted with serious economic problems: most of the former State-owned companies collapsed, unemployment rate is extremely high in certain areas and the goal of building up a flourishing economy based on medium and small-sized companies is still far away from realisation. As the economy in the New Laender of former GDR places particular demand on the State's subsidiary function, without subsidies, a lot of companies are unwilling to provide dual training. Recent figures indicate that today in the former East Germany less than 20% of all companies are involved in training activities. But there is slight hope: in 1996 the number of in-company training places could be raised by 2% (cf. Annual Report on Vocational Training, p. 2, 11). After reunification, a special programme for improving personnel qualifications in vocational training was started to provide better conditions. Further measures to encourage companies in the New Laender to provide more vocational training are put into consideration. Despite these measures, there are still a lot of serious problems in developing the dual system in the New Laender.

3.3 Development of training regulations cannot keep pace with the demands of a rapid changing environment

As in Germany the development of training regulations and curricula takes a long time, "new" regulations are sometimes obsolete, when they after many years of discussion and harmonisation finally come into legal action. The whole administration process is too bureaucratic. Many training regulations are not flexible enough to incorporate new developments. As a result, the methods to develop new general training programmes do not fit to the needs of fast changing labour markets. These problems are partly due to the different interests of those concerned and partly due to the sometimes overdone claim to create nation or Laender level wide regulations. Besides of that there is a lack of coordination between in-company vocational training and the vocational education in schools. To adjust training

programmes more effectively to changing and newly arising skill and knowledge demands, an overhaul of the system of nationwide training plan development is necessary and ways of improvement are already under discussion.

4. Prospects of the Dual System and Some New Concepts and Developments

4.1 The concept of an Open and Dynamic General Training Regulation

Finding and applying new ways and methods to develop general and specific training regulations more quickly and more effective is an important contemporary task to adjust the dual training system to new challenges arising from technological innovations and changes in the economic system. The traditional concept of centralised curriculum and centralised General training plan-making was based on the idea that changes in technology and economy as well as new norms of educational and social policy should be reflected in curricula while training regulations should work as binding legal directives for company training and vocational school learning. But today, it is no longer reasonable to ask for curricula and regulations with all-comprehensive nationwide comparability and recognition, mainly for two reasons: first, because today's changes take place with increasing speed so that nationwide regulations in many respects can not keep pace with accelerating changes, particularly if they occur in different areas with different intensity; and second, the centralised procedures of curriculum and regulation making are too bureaucratic and do not sufficiently take into account the concrete conditions and interests of local institutions, and therefore sometime may inhibit chances to creative and autonomous actions. Reflecting these circumstances, there is a discussion among German officials and researchers in the field of vocational training concerning the degree at which unified regulations are useful, and at which degree some freedom should be given to vocational schools, training centres and enterprises. A lot of experts support the concept of an "open and dynamic general training regulation", i.e. a curriculum or General training plan whose content is partly standardised and partly open to standardisation of local institutions like schools, chambers and training associations. Such partly open regulations give local forces a higher degree of freedom so that they know how to play a more important role, and as a result, adjustments to new developments of labour market can be made easier.

In the future, the dual system has to find some new ways to strengthen the partnership between vocational schools, companies and training centres. There are already some plans that companies schools and training facilities should cooperate in form of associations which do local research on new job requirements and also make proposals on how to define new training aims in General teaching regulations. Despite whether or not these plans will come into realisation, the basic procedure of General training plan and curriculum making is likely to stay unchanged, because it is associated with a culture of "social partnership", in which employers, organised labours, schools, and trade and industry participate to ensure a close connection between learning theory and practical training.

4.2 New ways to create training possibilities and to encourage companies to provide more training opportunities

It is a weak point of the German dual system that employers are not in any way penalised for lack of participation in vocational training. As in the past a considerable amount of companies provided dual training courses, there was no actual need to force them via lawsuit to participate in training programmes. But due to the decrease in in-company training places, there are some voices demanding binding regulations to force companies to take training responsibility. Some experts demand that companies unwilling to provide training places should be liable for a vocational training taxation. The funds raising from this taxation should be used to finance inter-firm and similar training centres. But there also a lot of people, particular from trade and industry, resist any punishment or taxation law on companies in order to force them to apply training programmes which are against economic rationality. These people argue that it would be better to rely on a system of incentives in order to encourage companies to offer more opportunities for vocational training. Instead of punishing companies unwilling to train, companies providing training should be rewarded for doing so. Therefore, measures should be applied to make the dual system more attractive. Some people consider to reduce the qualification level for trainers would it make easier for companies (particular for small-size companies) to provide training, because according to the present law, it is not easy for them to recruit or qualify qualified trainers according to the law on vocational training. To change the relation between practical training in the company and theoretical learning in the vocational school is also under consideration. If the trainee attends only one instead of two days a week of the

vocational school's courses, he or she can spend more time in the company where practical things can be studied more intensively. Of course, if doing so, there is also more time to use the apprentice as cheap labour. Another item under discussion is to reduce or at least not raising of the training grant. From all these measures it is hoped that they will enhance companies' interest in providing vocational training.

4.3 An integrated concept of life-long learning

The former strict separation between basic vocational training and further training is no longer up to date. The modern labour market needs people with a high degree of flexibility who are willing and able to adjust themselves to the new conditions and challenges. In the future, there will be a closer connection between basic training in the dual system with different kinds of further training and vocational retraining. All these forms of training have to be combined into one comprehensive and integrated system. On the organisational level it is a consequence of this development that those people who are responsible for developing curricula and General teaching regulations should also be in charge of the plans and regulations for further vocational training including the requirements of knowledge, skills and examinations. Apart from the connection between basic and further training, there are plans to establish a formalised structure of a "high level of Dual Training" beside the traditional basic education. Within this framework of plans and considerations, experts think about ways on how some useful elements of a modular-based education could be integrated into the dual system. In the long run, the dual system might be transformed from a system of basic vocational training to a comprehensive system of life-long flexible learning. One recent development in this area is the Master grand (Meister-Bafög). According to the new "Law concerning career related further education", state-support is given to those who after finishing a dual education take part in further vocational education in order to reach the level of a Master, technician or a similar qualification.

4.4 Extended use of new teaching, learning and instruction methods in the dual system

There are different methods of learning in schools and companies. In the school there is mainly formal classroom instruction, while in companies, the prevalent method of practical training is learning by doing. But in both places of learning, there is strong emphasis on the

use of modern teaching and learning methods. The modern learning methods are action-oriented or student-oriented. There is also focus on the use of modern media. The traditional monologue teaching is not going to be completely abandoned, but will be supplemented by other teaching methods and learning techniques. In Germany there is an ever-widespread use of different social forms of teaching, e.g. individual work, pair work, group learning, team teaching, which demand an active participation of student and therefore increase efficiency. A very popular method that lies between traditional monologue teaching and modern action-oriented teaching is the so-called "dialogue teaching method". The characteristic of the dialogue method is that the contents of learning are dealt with in a dialogue between the teacher and the students. The teacher, for example, can develop a new topic by asking questions or giving hints. Practical training in companies and teaching workshops often uses teaching methods like demonstration of skills, showing of an object or representation of an experiment by the trainer as a first step followed by the giving of orders, the setting of tasks and so forth. An ideal method of imparting practical vocational skills is the so-called four-stage-method, which consists of preparation (explaining the object of instruction, arousing the trainee's interest), demonstration (the trainer shows the activity to be learned and explains it both as the whole process and divided into individual segments), imitation (the trainees imitates the skill demonstrated, while the trainer watches him or her and helps or corrects, if necessary), and practice (the student uses the newly acquired skill, and the trainer checks the trainee's performance and the workpiece from the viewpoint of quality). (cf. Noelker/Schoenfeldt 1985, p.115f, 200ff). Action- and student-oriented teaching and learning methods make important contributions to the realisation of extrafunctional aims like ability to cooperate, decision-making, teamwork ability, logical and creative thinking and similar ones. As such key qualifications are useful for various occupational functions and positions, in future we need to apply new teaching and training methods on a larger scale. People who are educated and trained in such a way gain the power and ability to innovate. The use of action- and student-oriented teaching and training methods gives the trainee better job opportunities for the future, because - even if technological and economic changes occurs, people who possess the above mentioned extrafunctional qualification are able to fulfil a wide range of different job requirements.

4.5 Environmental education in vocational training

All kinds of occupational activity have more or less far-reaching impact on the natural environment. Shortage of natural resources and increasing destruction and pollution of natural environment all demonstrate that it is imperative to protect natural resources and reduce the ecological burden. Otherwise survival on the planet is seriously threatened. A consistent environmental policy also includes the field of vocational education for mainly two reasons: first, because most of the ecological problems are created by various kinds of occupational activities; and second, because successful measures of environmental protection should be based on a clear motivation and positive attitude towards the value of protection of ecological systems and a respectful treatment of the nature. Today, there is no occupational activity without impact on the natural environment. Consequently, the Federal Institute of Vocational Training (BIBB) in Berlin classifies all occupations in the following three categories: 1. Occupations with direct impact on natural environment (e.g. work in the chemical industry, agriculture), 2. Occupations with indirect impact on natural environment (e.g. all kinds of office work), 3. Occupations in environmental protection (e.g. all kinds of work in the environmental protection industry from garbage collection to environmental engineering. Occupations without any influence on the ecological systems are non-existent. Therefore, environmental learning must become a part of all-vocational training programmes and vocational school's curricula. For several years, the Federal Institute of Vocational Training has implemented environmental training contents in General training plans which are the basis of in-company training, and on the level of the Laender, the same was done for the vocational school, including school curricula, textbooks and other teaching materials. Issues concerning the environmental impact of the trainee's later occupation vary with the nature of the respective occupation. In general, they cover a wide scope of learning, ranging from prevention, control, monitoring and clean-up of environmental pollution over methods to save energy and resources, the storage of disposal and the handling of wastes, to the knowledge of laws and regulations on environmental protection and procedures of environmental monitoring and management. Beside the knowledge and skills of technical measure, environmental regulations and standards, and corresponding management techniques, environmental learning should also include exercises to enhance the trainee's environmental awareness and create in his or her mind a positive attitude towards a thoughtful treatment of the nature. In the concrete of modern towns and

sinister atmosphere of many workshops and offices, people do not have so many chances to experience the beauty of unspoiled nature. But one can not love what one does not know. Thus, lack of environmental consciousness is partly due to lack of opportunity to experience nature. In modern environmental education there are some learning methods and sensitive exercises that help the student to develop a higher appreciation of nature, and as a result, improve occupational environmental performance. Although in recent years there has been some progress, teaching and training issues in vocational schools concerning ecology and environmental protection are by far not enough. Due to the seriousness of the ecological crisis and the undeniable need of a clean and unspoiled environment for a sustainable development of mankind, environmental education in the field of vocational training is necessary to prepare the trainees to live and work in a world of ecological risks and challenges. In future models of vocational training - whether dual or modular based - there is therefore a growing importance to implement aims and issues of environmental education.

4.6 The challenges of a single European market

Vocational training is of prime importance in the process of European integration. The single European market brings a far more intensive exchange of information and experience as well as a transfer of knowledge and qualification in vocational training on an ever-extending scale. The new challenge of a European labour market also demands contributions from the side of dual system. The vocational education systems in Europe and their integration in the education system and the respective culture of these countries are very different. There are school-based systems like France and modular based systems as in Great Britain. Particularly the importance of in-company training is different. While there are 70% of an age group go through such kind of training programmes in Germany, only 6% of all young people complete in-company training programmes in the Netherlands. Owing to the profound nature of these differences, currently it is neither expected nor intended to harmonise the vocational education system. It is believed that freedom of movement on the European employment market demands neither standardisation nor formal recognition of training courses and qualification documents. But it is necessary to make country regulations and qualification levels of vocational training more transparent. On the basis of mutual trust in the quality of each country's national vocational training system, free workforce movement should be guaranteed by means of information

instead of complicated and bureaucratic procedures of recognition and certification. From 1996 on, in the Federal Republic for all the new occupations and reformed General training regulations, a so-called "training profile" will be made in German, English and French giving a description of the training time, training content, training skills and the typical fields of occupation that require such training. (c.f. Reformprojekt Berufliche Bildung, p.13f.) Transparency on the European labour market is also too good precondition to meet the challenge of globalisation that in the long run definitely requires transparency of qualifications and vocational school certificates at an international level.

Reference:

Arnold R./ Muench J.: Questions and answers on the Dual System of vocational training in Germany, Federal Minister of Education, Science, Research, Bonn 1996.

Berufsbildungsbericht 1997 - Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie - (draft), Bonn 1997.

Duale Berufsbildung (German, English, French and Spanish edition), Deutscher Industrie- und Handelstag, Bonn 1991.

Noelker, H./ Schoenfeldt E.: Glossar: Internationale Berufspädagogik. Sindelfingen 1985.

Reformprojekt Berufliche Bildung - Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie. Bonn 1997.

Puetz, Helmut: Flexible Orientierungen und neue Konzeptionen in der beruflichen Bildung Deutschlands, unpublished manuscript, Sommer 1997.

The Federal Minister for Education and Science: Vocational Training in the Dual System in the Federal Republic of Germany - An Investment in the Future (English edition), Bonn 1992.

Umweltschutz in der beruflichen Bildung. Arbeitsunterlagen und Materialien aus dem BIBB. Berlin 1988.

[Summary of the Discussion]

Kuang Ku Chen: The target students of the Dual System are 15-16 (years old). They are senior high school students. Should they go to work at the enterprises in the first year? Should every professional teacher in the vocational schools have working experiences in the enterprises?

Wagner: In the Dual System all trainees right from the beginning are to trained in companies. Now the first-year-trainees are at about 15-16, but there is a tendency that ever more high school graduates take part in a Dual Training course, even though they have also the qualification to enter a university. It is desirable that professional teachers in the vocational schools have some working experience, and some actually have. But this is not compulsory. Apart from the teachers of practical subjects like typewriting or metal work, all vocational school teachers need a university degree and a period of organized teacher training, but a trainer in the enterprise only needs a much lower qualification. He or she should not only hold a certain degree (e.g. a journeyman's certificate) but also have operation experiences as well as a brief education training.

Kuang Ku Chen: How does the government encourage the enterprises to take part in the vocational education?

Wagner: There are several ways. 1) Reduce the time of training at school from 2 days a week to one day a week so that the trainees may get more time to work for the enterprises. 2) Reduce the allowance rate. 3) A trainee may receive training in several enterprises rather than one enterprise (a new model).

Cheng Yonglin: One thing to add, the new German Chancellor advocated in his inauguration speech that the enterprises might take part in the vocational education in multiple ways rather than singular way. The enterprises should not be forced to take part in vocational education. The hi-tech enterprises may also invite engineering technicians to conduct professional training. It is beyond a school teacher. By the way, 70% of the vocational training in Germany is under the Dual System and the rest 30% is not.

Country Report Korea

Dr. Ikhyun Shin

(Korea Research Institute for Vocational Education and Training)

Strategies for Development of Vocational Education and Training in Korea

1. Situation of Vocational Education and Training

1.1 Outer surroundings

1.1.1 Economic conditions

- Changes in the employment trends by industry
- The rate of employment increase of Manufacturing becomes lower as shown in Table 1. The axis of the growth has moved from light industry to heavy industry. In Manufacturing, emphasis on high tech and knowledge-intensive trends will go up during the forecasted period of 1995-2010.

Table 1: Employment Increases by Industry (1995)

	Profes- sional techno- logist	Office manage- ment	Clerk	Sales	Ser- vices	Agricul- tural/ Fishery	Manu- factu- ring
Ave- rage	5.9%	4.8%	2.8%	3.7%	3.6%	-5.9%	1.6%

Resource: Korea Technological Education University, Mid- and Long-term Perspectives on Industrial Manpower, 1996.

Table 2: High Tech and Low Tech Employment Trends in Manufacturing

Year	1995	1996	1997	2000	2005	2010	1995-2010 Yearly Average Increase Rate

Total	4,773 (100.0)	4,721 (100.0)	4,765 (100.0)	5,050 (100.0)	5,259 (100.0)	5,349 (100.0)	1.0
High tech	2,692 (56.4)	2,715 (57.5)	2,792 (58.6)	3,122 (61.8)	3,157 (66.9)	3,824 (71.5)	2.5
Low tech	2,081 (43.63)	2,006 (42.5)	1,973 (41.4)	1,928 (38.2)	1,742 (33.1)	1,525 (28.5)	-1.5

Note: High tech and low tech is grouped based on the consideration rate of research and development over total sales (R&D/Sales).

Resource: Choi Gangshik and Kim Jungho, "Mid- and Long-term Perspectives in Manpower Demands - Progress to Knowledge-based Economy", Labor Economy, vol 20-1, Korean Society for Study of Labor Economics, 1997.

- The proportion of Agriculture and Fishery and that of Mining will become minute. The gravity of SOC & Services is expected to grow higher further (Table 3).

Table 3: Rate of Employment in Selected Industries (1996-2005)

	Agricultural & Fishery	Mining	SOC & Services	Total
Average growth rate yearly	-4.1%	1.4%	2.5%	1.7%

Resource: Bureau of Statistics, Yearbook of Economic Activities; Korea Technological Education University, Mid- and Long-term Perspectives on Industrial Manpower, 1996.

- Unstable job markets

- The advent of WTO in 1995, joining to the OECD in 1996, and the IMF relief funds in 1997, have forced the Korean economy to be unstable even though these external pressures have made fast internationalization and globalization within an accelerating changing circuit.
- Unemployment will be rapidly increased under the IMF system. Unemployment of the 45 and over-age group as well as that of young people will show a high incrementation. Especially, in the office business areas and worker with simple job skills will face difficulties in finding new jobs because of stagnation in economy.

Table 4: Manpower Demands on Scientists and Technologists (person, %)

	Current manpower (1997)	Manpower demands		Average increase of yearly needs	
		2000	2002	1997- 2000	1997- 2002
Doctors	4,885(0.8)	8,149	14,488	18.6	24.3
Masters	29,827(4.7)	37,261	50,501	7.7	11.1
Bachelors	218,512(34.7)	252,955	313,563	5.0	7.5
2-year graduates	113,257(18.0)	136,039	179,856	6.3	9.7
High school graduates	263,212(41.8)	295,224	351,125	3.9	5.9
Total	629,692 (100.0)	729,628	909,533	5.0	7.6

Note: The parenthesis are the proportion of manpower by educational and training achievement type.

Resource: The Ministry of Commerce, Policy Directions for Industry Manpower, 1997.

- Fluctuations in the workforce

- Shortage of high tech scientists

The manpower demands on manpower from the industry will increase rapidly. The current number of industrial technologists who are in charge of research and technical development, goes up to 630,000 in 1997. Though more than fifty-eight percent of them are two-year college graduates or higher. The ratio of manpower who has degrees is no more than 5.5% (Table 4).

Table 5: International Comparison of the Laborforce Quality (%)

	Korea (1991)	Germany (1978)	France	Britain (1974-78)
Proportion of school diplomas among work force in manufacturing				
School diploma	10.9	3.5	-	3.3
Certificates	7.7	60.8	-	28.7
No qualifications	81.4	35.7	-	68.0
	Korea (1991)	Germany (1987)	France (1988)	Britain (1988)
Proportion of school diplomas among supervisors in manufacturing				

School diploma	0.7	-	1	3
Higher class certificates	3.1	64	4	3
Lower class certificates	13.2	29	51	39
No certificates	82.9	7	44	55
Proportion of school diplomas among technologists in manufacturing				
School diploma	11.6	7	3	12
Higher class certificates	19.5	36	21	14
Lower class certificates	28.7	49	49	43
No certificates	40.2	8	27	31

Resource: Juho Lee, Policy Directions for Labor Force and HRD, 1996.

- Lack of technologists

The mid-level manpower is extremely scarce compared with forefront countries. Training of technologists becomes a serious issue to enliven the production power of the nation's economy hereafter. Compared with major OECD countries, the proportion of qualified technologists in manufacturing sector is low as 7.7% (Germany 60.8%). And non-qualified labor force is high up to 81.4% (Germany 35.7%). Only 3.1% of the supervisors are holding the brass level qualifications, non-qualifiers, 82.9% though (Table 5). The qualification rate of the technologist is low as 19.5% for the brass class.

- Discord in demand and supply for technicians

Technical innovation and diversified market situation induces a flexible production system which shows a turning phase from the mass-production of selected number of goods to the focused-production of overall goods. Accordingly, high level multi-skilled technicians are seriously required, and demands on the less skilled-workers are rapidly reducing. Therefore, policies are required to enhance the quality of technician instead of adapting only to the quantitative needs from the industrial sector.

1.1.2 Social and cultural junctures

- As the age of knowledge and information comes over and as technology and innovation is on the acceleration lane, it is expected that the structure of the industry will change to be further services-oriented and knowledge-based and that the world of work will face radically changes producing jobs which need more knowledge and creativity. The world of work will accelerate the multiversity and

diversity of jobs due to the intensified knowledge, information, and technology.

- Korean society is changing towards this direction, which means vocational education and training policies should be remodelled responsive to these trends. The work is recognized as 'ever-changing vocation' instead of 'lifelong job position.' Traditional life-long services is changing to the regaining of new job abilities in the world of work, emphasizing continuous learning efforts beyond educational achievement course or gifted inheritance.

1.2 Advent of internal needs

1.2.1 Vocational education and training needs

- Changes in latent pool for vocational education and training are not favorable for vocational education and training.
- Population: The rate of increase in the manpower supply are stable at this point, but the potential population which are thought to be productive becomes aging (Table 6).

Table 6: Forecasted Productive Population Growth (%)

Years	Age group		
	15-64	15-34	35-64
1980-1990	25.2	21.4	31.0
1990-2000	13.4	-5.7	39.8
2000-2010	5.4	-13.3	23.0
2010-2020	2.6	-6.0	8.3

- Children of school age: Slow growth of population results in narrow admission pool to the vocational education and training both in the secondary education and in higher education (Table 7).
- Trends of high credentialism: The 18-21 age group and 22-25 age group show the participation rate of 30.8% and 16.3% to the higher education, which exceed the average level of OECD nations (Table 8).

The proportion of the vocational schools and general high schools is 37:63 in 1997, which means vocational programs are narrower than academic programs in high schools (Table 9).

Table 7: Changes of School Age Group by School Level (%)

Year	Total Popu- lation	All School Ages (6-21)	Elemen- tary Schools (6-11)	Middle Schools (12-14)	High Schools (15-17)	Colleges (18-21)
1960	25,012	8,552	3,629	1,566	1,417	1,941
1970	32,241	12,604	5,711	2,574	2,101	2,218
1980	38,124	14,401	5,499	2,599	2,671	3,632
1990	42,869	13,361	4,786	2,317	2,595	3,663
1995	45,093	11,918	3,901	2,443	2,349	3,225
2000	47,275	11,339	4,081	1,877	2,150	3,231
2010	50,618	10,963	4,100	2,124	2,125	2,615

Resource: Bureau of Statistics, Future Population, 1996.

Table 8: Participation Rate to Higher Education (18-25 Age Group, 1994) (%)

Age	Korea	U. S. A.	Canada	France	Britain	OECD
18-21	30.8	34.9	40.3	33.2	23.6	21.5
22-25	16.3	20.9	22.8	17	8.4	15.3

Resource: OECD (1996), Education at a Glance: OECD Indicators, pp. 127-128.

Table 9: Proportion of Student Bodies in General High Schools to Vocational High Schools

Year	1990	1991	1992	1993	1994	1995	1996	1997
Gene- ral :								
Voca- tional	69:31	68:32	66:34	65:35	63:37	62:38	62:38	63:37

Resource: The Ministry of Education, 1997.

More than 47% of the students in the vocational high schools hope to enter colleges and 29.2% of the total students enter the colleges (Table 10). As a result, supply of technicians from those vocational high schools decreasing.

Table 10: College Entrance and Employment (1997) (person, %)

	General High Schools	Vocational High Schools	Total	'97 Freshmen	Misc.
Number of Graduates	397,702 (100)	273,912 (100)	671,614 (100)		
Number of High School Graduates Hoped for Colleges	378,127 (95.1)	129,934 (47.4)	508,061 (75.6)		
College Freshmen	323,830 (81.4)	79,961 (29.2)	403,791 (60.1)	577,694	174,903

Resource: National Education Evaluation Center, Education Statistics Yearly.

1.2.2 Connection of vocational education and training contents to the job world

- Most of the industry leaders understand that employees need extra training to perform their duties in the work field (Table 11).

Table 11: Retaining Needs on Technician from Employers (%)

Necessary	So & so	Not necessary	Total
88.8	9.3	1.9	100.0

Resource: Chunsoon Lim. Study on Demand and Supply for Industry Workforce, 1993.

1.2.3 Limitations in further education opportunities

- Seventy percent of vocational high school graduates have limitations in developing job skills through further education.

Table 12: High School Graduates' Admission Rates to Higher Education (%)

	Proportion of High School Graduates Hoped for Colleges	Admission Rate to:		
		Total	4-year colleges	2-year colleges
1980	31.2	10.1	4.0	5.5

1985	30.0	13.3	4.3	8.8
1990	22.1	8.3	2.6	5.5
1995	35.6	18.0	6.2	12.8
1997	47.4	29.2	9.0	19.8

Resource: National Education Evaluation Center, Education Statistics Yearly.

- Low participation rate to high education

Adults are excluded in higher education because of the breach mechanism of higher education institutes in which elders are not invited to the campus. The proportion of students at the age of 25 and over who entered the colleges is 20.1%, lower than that of U.S.A., 45.9%.

Table 13: Proportion 25 and Over Age Group in Higher Education Institutions

Number of student over 25(person) Percentage in total students (%)		
Korea	500,446	20.1
U.S.A.	9,683,064	45.9

Resource: Presidential Committee for Educational Reform, 21 Century Korean Education, 1997.

The share of the workers in continuing study and training programs is quite low, 5.4% (Japan 13.0%, U.S.A. 34.0%, Germany 33.0%, France 40.0%) (Table 14).

Table 14: Participation Rate to Continuing Education (25-64 age Group) (%)

	Korea	Canada	U.S.A.	France	Germany	Japan
Year	1996	1993	1995	1994	1994	1994
Participation Rate	5.4	28.0	34.0	40.0	33.0	13.0

Resource: OECD, Education at a Glance: OECD Indicators, 1996, p.133.

1.3 Appearing needs on vocational education and training

1.3.1 Preparation for slow growth of the workforce training and for aging of the workforce

- Manpower supply goes down to the sluggish growth of the total population. The demands on vocational education and training of women, the aged, and the disabled will go up further, responsive to their expanded economic activities.
- The central axis of the national production group becomes aging. The new arising needs to retrain these workforce and rehabilitate their job status will be deepened to the adult vocational education and training.

1.3.2 Responses to the decrease of schoolage population and to the increase of credentialism for higher academic diploma

- As the admissive pool for vocational high schools and traditional vocational training centers decreases, those students with deficient readiness for successful academic preparation will learn farther than those who are well academically equipped.
- The competition among postsecondary education institutes will be deepened. The admission pool will be overflowed compared with high school graduates, which means many higher education institutions will face difficulties closing their doors down, as the current downturn of high school graduates continues further after 2003. In consequence, orders in the competitive situation to induce more students should be established and institutional specialization should be induced further.

1.3.3 Navigation of training method to train qualitative workforce

- The elevation of the qualitative gravity of the workforce are highly respected, since the importance of training of proficient manpower with multi-functions and high academic diploma goes up while labors with simple skills are degraded further.
- Demands on high level manpower equipped with those well prepared occupational aptitudes and multi techniques which are prerequisite to cope with the rapid changes in industrial structures

and job designs will be increased further. This trend will change the training needs from the simple supply mode to improvement training, retraining, or transfer training of the existing manpower (table 10), and will be the main cause for enlargement of continuing education for adults.

2. Efforts to Develop Vocational Education and Training

2.1 Backgrounds for establishment of vocational education and training strategies

- Unstable growth and high unemployment will continue for the time being because of stagnated economy, as an aftermath of industrial restructuring, and employment status adjustment under the IMF management system.
- Knowledge and information are regarded to be more materialistic as the main forces for economic development and as the value-added resources because national production and growth will depend on advanced technology and accumulated knowledge.
- On the other hand, human resources development through fortified vocational education and training to recover international competition comes to the stage as an important role of the nation.
- In consequence, individual efforts for further development of job skills and the national planning for comprehensive human resources management to secure high level manpower will be provocative.

2.2 Major characteristics of vocational education and training strategies

2.2.1 A mid-term or short-term national plan

- National vocational education and training strategies will have two functions. First, they will work as short prescriptions dealing with unemployment. Second, they will be mid-term plans for the development of vocational education and training based on long perspectives.

2.2.2 A comprehensive national manpower development plan

- National vocational education and training strategies will work as an overall management of the national manpower development. They will deal with comprehensive situations in which industrial training, vocational education, and vocational training are reviewed all together for the better management of manpower development practices. New directions of vocational education and training will be announced as a package human resources development including private sectors as well as public efforts.

2.2.3 A high ranking national implementation plan

- National vocational education and training strategies are needed to guide manpower training which is squandered in every vocational education and training agencies.
- These strategies will work as a basic foundation and reference to every vocational education and training body installing yearly implementation plans. To the educational institutions, the strategies will work as self-assessment tools or as growth indicators for better organizational advancement.

3. Vocational Education and Training Development Strategies

3.1 Visions for vocational education and training

Three visions for Vocational Education and Training were accumulated as foundations for vocational education and training strategies.

First, individuals are able to upbring their own employability independently through vocational education and training. The world of work will change rapidly and distinctively asking advanced knowledge and information. Individuals should improve their own job skills continuously to cope with new changing demands.

Second, Korean society will be able to establish a society in which job skills are highly respected instead of academic careers. Indiscrete competition towards credentialism is one of those problems harmful to societal improvement. Vocational education and training system is

going to contribute to the establishment of ability-based society in which those who have better abilities have more opportunities to be advanced.

Third, the nation will be successful to construct a competitive potentiality through establishing of infrastructure distinctively to cope with knowledge-based global society. National competitive power comes from human resources and from controlling power over knowledge in the 21st century. The quality of manpower will be developed through competitive goodwill and reciprocal cooperation.

3.2 Major goals and objectives for development of vocational education and training

3.2.1 Arrangement of the conditions and opportunities for job skill development based on learner-initiative

Vocational education and training should emphasize the education of people that will improve their own job skills independently instead of dealing passively with given and routine educational and training pass, towards which overall support and expansion of training opportunities should be provided enough to develop their job ability continuously and initiatively.

3.2.1.1 All individuals will train to activate their learning ability independently.

What for

- All individuals should continue to develop their job skills to cope with the 21st century knowledge and information. Therefore, all training process should be remodelled enough to provide basic vocational education and training for all individuals to develop their job skills independently.

Implementation directions

- Cultivation of basic learning abilities and study habits
- School education emphasizing cultivation of basic job ability required to job performance and continuous learning such as information utilization ability, communication ability, mathematical utilizations, and social skills (review on the possibility of connection to the appraisal system for job abilities)
- Renovation of elementary and secondary curriculum connecting

academics to vocational provisions

- Innovative renovation of teaching and learning methods by adopting such methods as problem solving, learning how to learn, and learner-centered training, which will help them develop their own learning styles even after the graduation of formal schools
- Improvement of assessment methods in vocational education and training
- Development of multiple assessment tools
- Inducement of self-directed learning in every vocational education and training activity
- Problem solving learning method and independent learning habits. Individual efforts to develop job skills backed up through on-the-job training using utmost information and communication and through home education

3.2.1.2 Career education system will be systemized enough to help all students and adults develop their own career blueprints.

What for

- A system should work for individuals to give right understanding for work, to understand the world of work comprehensively, and to make themselves understand that training offered appropriately to their career designs will help recursively in their job-related decision making. Thus career education should be emphasized and systemized for lifelong considerations.

Implementation directions

- Implementation of systematic and continuous career education for all elementary and secondary education
- Career education based on principal's discretion and through the extracurricular activities in each school
- Career education in cooperative efforts between teachers, business leaders, parents, counselors, and educational institutions.
- Build-up of connections between school grades by adopting career process recording system
- Systemization of lifelong career education for adults
- Systematic support towards the career education through counselling along with supplementing human and material resources
- Assignment of well-trained counselors to adult profession consulting center or job rehabilitation centers

- PR for better understanding towards work and vocational education and training
- Information sharing and education for sound workmanship through mass media such as TV, radio, and newspapers

3.2.1.3 All conditions will be remodelled to expand the opportunities for continuous vocational education and training.

What for

- Opening and continuing vocational education and training system should be established to provide all individuals who want it to cope with the rapid changes in job world.

Implementation directions

- Formulation of institutional foundation
- Connection of vocational education and training institutions or programs
- Provision of various vocational education and training program delivery systems such as internet, VOD (Video on Demand), virtual reality to provide every way in any condition to everybody
- Fortification of customer selection
- An approach to establish vocational education and training institute to support the regional efforts of organizing 'learner union' which take roles of contract builder or trainer.

3.2.1.4 A positive support system will be initiated for the expansion of employability of women and some other vulnerable groups such as the aged and people with disability.

What for

- Vocational education and training should respond definitely to the learners who want to develop their job skills further. The principle of equal opportunity in education and training should be emphasized. In addition, positive support for women and other vulnerable groups in vocational education and training should be institutionalized to give them more opportunities in developing job skills and, in turn, securing their right for lifelong learning and better lives.

Implementation directions

- Provision of various working conditions to female workers
- Provision of various inducement programs such as career education, provision of scholarships, special admission
- Adoption of voucher system for the vulnerable groups
- Provision of comprehensive vocational and training centers for the disabled in every region and provision of diversified vocational education and training programs to them
- Emphasis on vocational education and training for not college goers and high school dropouts.

3.2.2 Enforcement and implementation of constructive vocational education and training to meet with unemployment

A countermove should be initiated under the severe unemployment stage resulting in the IMF financial supports, in which effective vocational education and training plans are included for expansion of possibilities for job transfer and of job skill development opportunities.

3.2.2.1 Diverse vocational education and training will be implemented to meet the various needs of the multiple jobless.

What for

- Unemployment which is the main cause of restructuring movement seems to be imminently dangerous in the labor market. In consequence, positive training efforts should be announced to deal with high unemployment. For this, vocational education and training programs should be provided diversely to meet the needs from the jobless.

Implementation directions

- Enforcement of vocational education and training for the jobless especially for those who lost their job position in office management areas and for those with high educational credentials who did not have any chances to job
- Expansion of certification function to the public job training centers
- More considerations on the short-term content-intensive adaptation programs, on information aquisition for newly developed jobs, on the new opportunities for aquisition of up-to-date technology, and on the

job performance training implementation

- Provision of diversified vocational education and training for the jobless
- Future-oriented vocational education and training programs helping individuals to regain their jobs

3.2.2.2 Efficiency curve of vocational and training for the jobless or job losers will go up.

What for

- Efficient management of the vocational education and training should be introduced since vocational education and training for rehabilitation will require amount of financial provision. In consequence, vocational education and training should be connected to the financial support by pronouncing vocational education and training effectiveness and financial efficiency.

Implementation directions

- Fortifying connection system of vocational education and training results to employment
- Establishment of employment conciliation and employment counselling as a bridgehead to job world connecting training to the jobs and accumulation of partnership among the concerned to vocational education and training
- Development and utilization of a package program consisted of vocational education and training, and of job rehabilitation
- Appraisal and management of vocational education and training results
- Construction of infrastructure in vocational education and training for the jobless
- O Encouragement of private participation to vocational education and training for office work and management
- Provision of effective financial support system

3.2.3 Fortification of vocational education and training with emphasis on contact to the job world

Effective vocational education and training is related to the world of job. Vocational education and training should be prepared to reflect

the needs from the job world and to combine work and learning emphasizing employability and national competitiveness.

3.2.3.1 Vocational education and training will change its focus form knowledge and theory-bounded training to job performance emphasizing.

What for

- Vocational education and training emphasizing job performances should be implemented based on the partnership between the industry and vocational education and training institutions by helping students acquire job skills and helping them to make soft connection to the job world.

Implementation directions

- Development of vocational education and training curriculum and program centered on job performances
- Development of vocational education and training curriculum based on job analysis
- Secured participation of the business sectors to the curriculum development stage
- Provision of training programs emphasizing field experiences
- Development and distribution of diversified field programs such as real work practices and internships
- Development and distribution of utmost modern teaching materials appropriate to diverse vocational education and training

3.2.3.2 The industry sector will have derived responsibilities towards vocational education and training.

What for

- Work world and learning society should be connected directly for effective vocational education and training. For this, sincere participation of the business sector to vocational education and training activities are highly emphasized.

Implementation directions

- Learning organization in the industrial sector
- Inducement of learners' participation through diverse appraisal system such as credit deposit system, private appraisal system,

portfolio assessment to record both academically and occupationally by connecting learning credits to work fields

- Review on the lifelong career education system and business careers as office workers to develop systematic career development
- Activation of consignment vocational education and training with emphasis on clients
- Activation of vocational education and training in business sectors through utilizing job skill development functions in the employment insurance system
- Activation of vocational education and training at two-year colleges, technical colleges, and open colleges in business sectors
- Expansion of needs-based vocational education and training responsive to the industrial needs
- Provision of incentives for vocational education and training participation especially by the industrial sectors
- Stable political considerations on the provision in the current labor insurance system for vocational education and training improvement
- Provision of preventing system against excess scout by establishing job rehabilitation centers
- Appraisal of vocational education and training effectiveness in terms of job performance
- Diversification of participation in vocational education and training for the business sectors
- Establishment of a consulting committee in every work place
- Participation to the policy formation and implementation stage through membership in regional vocational education and training committees

3.2.3.3 Vocational education and training teachers will be trained to utilize their adaptability to the work field and profession.

What for

- It is most important to emphasize vocational education and training teachers' work experiences and their professionalism to successful vocational education and training. Thus, teachers should be trained to equip both with theory-based knowledge and work-oriented experiences and their retraining should be announced and implemented funky to retain these teaching abilities.

Implementation directions

- Training of able teachers equipped with theories and workability
- Renovation of teacher training activities emphasizing development of teachers, apprentice teachers, and on-the-job training in the work place
- Complete attendance to those courses related pedagogy in teacher training programs to improve teaching skills even in two-year colleges, technical colleges, and industrial colleges
- Innovative system for teacher appointment
- Combining of the splitted subject matters by joining into more comprehensive subject matter qualifications
- Adoption of teachers from the business sectors by giving duties according to school performance, job performance, and aptitudes
- Training and assignment of professional lifelong career guides
- Transferring social education professionalists to lifelong educators
- Build-up of more workability for vocational education and training teachers through on-the-job training in the busienss plant

3.2.3.4 Training of professional scientific technological manpower equipped with job related adaptation will be propelled.**What for**

- Creative and professional workforce should be trained to enhance national competitiveness coping with the advent of information and knowledge, utilizing the high technology. For these purposes, continuous development of job skills should be enshrined and vocational education and training in the formal education system should be structured according to the changes in the work field.

Implementation directions

- Raise and support for the development for colleges for training professional and technical manpower training
- A specialization effort to connect two-year colleges and colleges in the business sectors to regional industries and other related areas
- Establishment of technical colleges in the work fields for further education of the plant workers
- A special consortium with two-year colleges and industries to share training programs, teachers, and facilities
- Establishment of graduate schools for professional technical vocational education and training

- Opening of professional technical graduates in potential universities and honoring of high level diploma of degrees such as professional masters or doctors.

3.2.4 Institutionalization of a social appraisal system

Construction of a society in which job skills are favored much more above all than educational diploma. Vocational education and training should be activated further through institutionalizing an appraisal system for objective assessment of vocational education and training practices.

3.2.4.1 Efforts to publicize the social acceptance of the certificate will be formalized by putting national confidence in qualifications.

What for

- Construction of job skill centers instead of school academic history will be the activation of an appraisal system through which vocational education and training results are appreciated to be a sound accumulation of human resources. Public trust on the appraisal system should be established and flexible management of the system enough to cope with the rapid changes in the job world.

Implementation directions

- Building connection between vocational education and training and appraisal system
- Development of national skill standards and their utilization for vocational education and training assessment
- Adoption of credit deposit system
- Activation of private appraisal system
- Expansion of participation to appraisal activities especially by association, by professional bodies, and by business sectors
- Building connection to the national qualifications if needed.
- Better supports for national appraisal system improvement

3.2.4.2 An appraisal and authentication system will be enforced for sustaining standards in job skills.

What for

- Various institutions will be provided to acquire formal school

diploma and practical job skill certificates to which social appreciation can be attached, through which open vocational education and training system can be activated for further education adults can join.

Implementation directions

- Activation of professional degrees
- Activation of profession degrees to absorb diversified college level diplomas into a single system
- Activation of credit deposit system
- Preparation of exchange system between academic credit approval system and appraisal system for qualifications
- Use of education accounts and human resources accounts to introduce individual vocational education and training experiences and human resources management
- Establishment of comprehensive appraisal system for connecting, managing, and utilizing academic achievement, career, qualifications, credits, and experiences should be sought for.

3.2.5 Fostering of autonomous and competitive vocational education and training market

A training market in which autonomy and competition is highly valued should be nurtured to highlight the quality of training. It can be a rapid response to the circumstantial changes and for fortifying customer selection in vocational education and training.

3.2.5.1 The functions of the public bodies will be fastened to answer for the principles of competitive market.

What for

- Vocational education and training policy operations in the 21st century knowledge-founded age should be designed to be customer-oriented. Job skill development should be under the control of free market principles instead of authoritative national initiatives. Public factors should be readjusted through the perspective establishment of autonomous and competitive vocational education and training market.

Implementation directions

- Application of the free market principles to the public bodies

- Free market concepts solvent to the competitiveness
- Arranging national or regional bodies to have independent corporate rights step by step, by which they play vital roles along with a sense of responsibility
- Further expanded connection to the institutional appraisal facilitating competitive growth between and among governmental and private sectors
- Establishment of infrastructure in vocational education and training market
- Support for research and survey activities for vocational education and training
- Support in the establishment of vocational education and training institutions with specific purposes
- Establishment of infrastructure for distance education through inducing distance communication agencies and teaching material development centers for distance education
- Establishment of vocational education and training organization to share human and material resources and to facilitate the common use of the information
- Emphasis on the market failure areas
- Expansion of job skill development for those who are disabled

3.2.5.2 Private participation to vocational education and training market will be introduced by proposing concrete participation merits.

What for

- Private participation must respond with the advent of knowledge-based society and secure opportunities for self-directed learning by individual learners.

Implementation directions

- Deregulation or abolishment of useless regulations
- Easing of foundation criteria and specialization and diversification of vocational education and training system
- Nurturing vocational education and training related circles
- Technical academies separated for the current college prep academies and nurtured only for vocational education and training
- Dispatch of services corps taking the roles of technical consultation and vocational education and training related activities

3.2.5.3 An appraisal system and those principles for better competition will be provided to improve the quality of vocational education and training and to help customers select their jobs without failure.

What for

- Government leading vocational education and training policies are not enough to cope with new changes in manpower demands on intensive technology and knowledge-focused practices even though they are contributed so much to training national manpower. So, free competition should be introduced to deal with these needs for better manpower. In other words, competitive principles in free markets should have new rules for job skill development.

Implementation directions

- Keeping trustworthy appraisal system
 - Identity of appraisal bodies required for the establishment of trustworthy appraisal information and utilization
 - Categorization of the appraisal context arranged in vertical order
 - Emphasis on appraisal references and setting its aggravated aspects
- Review in the possibility to adopt voucher system
 - Enhancement of vocational education and training quality by enforcing customers' selection opportunities over the institutions and the programs

3.2.6 Reorganization of vocational education and training implementation system

The implementation stage for vocational education and training strategies should be decentralized to the regional level first and to the related groups such as industries and academies, and some other vocational education and training agencies. Vocational education and training system should be private-engaged avoiding government-leading practices. And a connecting system between the governmental bodies and private stakeholder will be an ideal scheme for improvement of vocational education and training.

3.2.6.1 Local committees to deal with vocational education and training problems and to support vocational education and training efforts in the regions will be organized based on partnerships of the industry, academics, and the government.

What for

- To be effective, vocational education and training policy formation and its implementation should be decentralized and more participation from the concerned should be encouraged. For this, institutionalization of partnership among business sectors, academics, and governmental agencies should be enforced.

Implementation directions

- Deliberation of vocational education and training by a central policy committee and regional discussion committees
- Discussion committees playing vital roles of connecting bodies between national aspects and vocational education and training field operations, initiating the regional participation which will be major factors for successful management of vocational education and training strategies
- Enforcement of regional agencies' role in further adult education related job skill development

3.2.6.2 Financial support system will be constructed towards the enhancement of autonomy and creativity in private sectors.

What for

- More investment on vocational education and training in the age of knowledge and information are required for effective vocational education and training. Especially, financial supports should be arranged to secure the autonomy and creativity in private sectors.

Implementation directions

- Enhancement of financial support
- Review on the possibilities to form new funds such as human resources funds
- Adjustment of priorities among financial supports

4. International Cooperation in Vocational Education and Training

4.1 What for

- The types of international cooperation is changing diversely from the traditional recipient implementation stages to the reciprocal practices with advanced nations and to the eager participation to the international organizations along with changes in the international topology Korean economy holds. And private sectors are growing in taking part in the international cooperation tasks. Thus, reorganization of implementation system of the international cooperation duties should be sought for.

4.2 Implementation directions

- To establish infrastructure for better international cooperation by sincere connection among nations and private participation, the following suggestions could be made.
 - Construction of information network of information centers to deal with international cooperation
 - Participation of NGOs in acquiring financial bases and implementing vocational education and training activities
- Expansion of information exchange along with manpower exchange between international organizations

[Summary of the Discussion]

Wagner: South Korea belongs to the family of the so called new industrialized countries, and vocational training has very much contributed to the countries economic development. Vocational education in South Korea used to follow the example of the West, and for some period of time also studied German models. Now it has formulated its own system and characters.

Xu Wenlong: Now that Shanghai is also facing the transformation of industrial structure, Korean experiences are enlightening. South Korea has set down new vocational education development strategies to adapt to the transformation of industrial structure. What are the characteristics of the new strategies?

Ikhyun Shin: The major characteristics of the new strategies are as follows: 1) They are mid-term or short-term national plans. 2) They are comprehensive national manpower development plans. 3) They are national implementation plans of the manpower development in the highest ranking.

Lorenz: How to integrate the "Three Visions" (for the individual, the society, and the nation respectively) mentioned in the report? What concrete measures have you taken to encourage the secondary vocational school students?

Ikhyun Shin: We provide opportunities for secondary vocational school graduates who'd like to receive further education.

Yu Zuguang: How to conduct the college entrance examination? What are the two-year colleges' target students?

Ikhyun Shin: The two-year colleges take in the secondary vocational school graduates. The entrance examination is separated from that of general higher education.

Country Report Singapore

Edward Ho and Evangeline Chen
(Nanyang Polytechnic Singapore)

The Integrated-Technology Teaching and Learning (ITL) Concept – An Effective Approach for Technical Education

1. Introduction

Singapore is an island state with approximately 3 million people. It is located about two degrees north of the equator. Over the three decades since its independence in 1965, the Singapore economy has grown at an average of 9.1% per annum. Its real GDP per capita has increased six times, from \$3,072 in 1960 to \$19,005 in 1990. The economy has provided jobs for 1.5 million persons (including foreign workers) in 1990, as compared to the figure of 471.9 thousand in 1957.

'Singapore has obviously done very well in a number of key areas starting with the emphasis on labour-intensive exports, seeing the need for education and training for the movement to higher productivity, making Singapore a 'hub' for manufacturing, ...'

Dr Helen Hughes, a consultant to the Asian Development Bank, wrote in the book 'Challenge and Response - Thirty Years of the Economic Development Board'

Technical education in Singapore has been developed in tandem with the progress of its economy. The role of technical education has been expanded from being a financial burden to a contributor to economic progress; from merely keeping kids off the streets to providing cutting edge technological knowledge and skills to a new generation of technical manpower.

The short history of development of technical education system in Singapore revealed that while the economy went through a dynamic rate of growth, its technical education system had also seen significant developments to meet the ever changing needs of the industry.

It is quite well known that the Economic Development Board of Singapore (EDB) contributed significantly in the development and growth of the economy, but not many are aware of the substantial role

it played in the making of technical education in Singapore. It all started with EDB's strategy of attracting foreign investment in Singapore. The foreign investment not only brought the financial assistance and technology transfer of foreign governments, but also brought the expertise in the development of training systems, training curricula, and training resources which were subsequently adapted by many institutes of technical education.

The expertise gained from the partnership with many countries was adapted to the local context, giving rise to a new training system that is uniquely Singaporean. This "Teaching Factory Concept" (see Annex), as it was called, became the hallmark of the EDB's institutes of technology.

In a chapter on the EDB in the book 'Challenge and Response - Thirty Years of the Economic Development Board', Dr Linda Low concluded that 'The greatest innovation that the EDB has made in Singapore's industrialisation efforts must, however, be in its manpower and training schemes.' When these institutes, namely, the German-Singapore Institute, French-Singapore Institute and Japan-Singapore Institute, were transferred from EDB to Nanyang Polytechnic in 1993, it became quite clear that the Teaching Factory Concept will be further developed and enhanced under its originator, Mr Lin Cheng Ton, who is now the Principal & CEO of Nanyang Polytechnic.

While developing the Teaching Factory Concept, which advocates strong institution-industry linkages in joint projects as well as technology development, the Principal of Nanyang Polytechnic recognised that innovative approach in pedagogy and teaching is equally important to make the technology training more effective. He took this challenge and developed the Integrated-technology Training and Learning (ITL) concept which incorporates case studies of industrial applications into the teaching and learning environment in a manner that will maximize the transfer of teaching and learning.

2. The Concept

ITL is an innovative concept adopted by Nanyang Polytechnic, with an aim to accelerate and strengthen the learning of engineering concepts and applications, especially for teaching the application of a multi-disciplinary technology like mechatronics engineering, to

maximize the transfer of learning from the school environment to the work environment.

2.1 Definition of mechatronics technology

Mechatronics is a relatively new discipline in engineering. It has evolved from a simple fusion of mechanical and electronics engineering to a complex integration of various engineering disciplines including electronics, computer, control and mechanical engineering. It can also be considered as a product of innovative applications of specialist electronics and computer technologies on traditional mechanical-based products or systems. Mechatronic products are popularly used everyday. These include autofocus cameras, industrial robots, quality inspection systems, etc.

The development in mechatronics is in tandem with developments in information technology, microelectronics, control and automation technology. Appropriate use of mechatronic technology will lead to cost-effective and high performance systems for the industry.

2.2 Three-tier model for ITL lab

There are currently eight ITL labs in NYP. Each lab was developed based on a three-tier model.

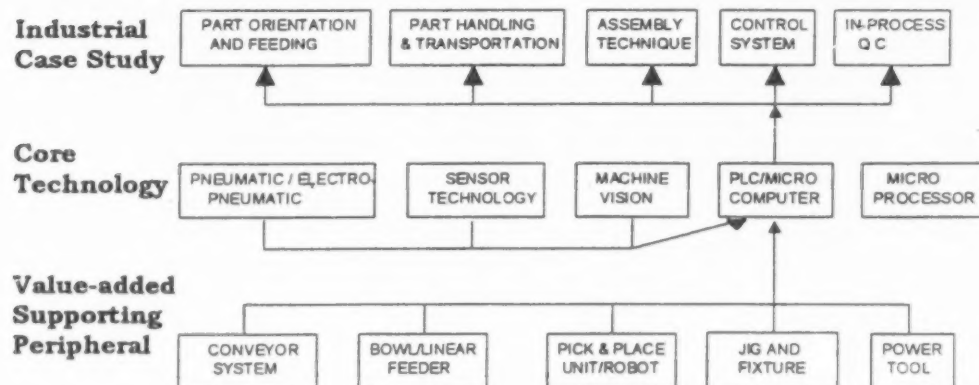


Figure 1

The model in Figure 1 reflects the basic constructive technology units on which the three learning orientations are based (see figure 2). The units can be categorized into three types (industrial case study, technology module, and supporting peripheral), and the combination of two or three types of units results in three different learning

orientations. The vertical arrows indicate different levels of system integration (see Teaching Aid in Figure 2), while horizontal arrows indicate the integration of technologies.

2.3 The learning orientations

The three learning orientations are the result from the combination of two to three types of the basic constructive technology units. Together with the objectives, teaching strategies, and the teaching aids used to help students achieve the objectives, each learning orientation is illustrated in Figure 2.

Learning Orientation	Objective/Strategy	Teaching Aid
Technology	Students <u>apply</u> engineering principles of the core technology in the technology module.	Technologies include Programmable logic control, motion control, machine vision, robotic technology, and system building.
Value-added Engineering	Students <u>recognize</u> the general application of core technology from a simple Mechatronics system , which is a technology module integrated with supporting peripheral units.	Technologies shown above are the integration of Supporting peripheral units like part feeder, pick and place unit and the conveyor system.
Solution	Students <u>discover</u> the specific application of core technology in industrial cases , from complicated mechatronics systems, which is a reproduction of one of the past industrial projects.	Technologies shown in stage one are integrated with Supporting peripheral units for industrial-based solutions , like part handling and transportation, automatic testing and inspection and automatic assembly.

Figure 2

2.4 Development of teaching aids in the three learning orientations: Technology, Value-added engineering, and Solution

2.4.1 Technology oriented learning

In Singapore, the development of mechatronics is closely associated with the application of automation in industry. As such, key areas for technology training modules are identified, and turned into core technologies later, one for each ITL lab, to reflect actual industrial technologies required by practicing engineers.

Electro-pneumatic control, robotics, machine vision, and programmable logic control are some examples of mechatronics technologies relevant to the local industries.

2.4.2 Value-added engineering oriented learning

Staff of Nanyang Polytechnic designed and developed mechatronics systems of suitable physical dimensions for laboratory use to illustrate the integration of the core technology module with the supporting peripheral units. These in-house training systems are used as teaching aids to show students a general application of core technology in the lab.

2.4.3 Solution oriented learning

Actual industrial applications are reproduced as case studies to enable solution oriented learning. The reproduced case studies are based on previous industrial projects that we had taken to provide valuable exposures on the aspects of technology integration in specific applications. Being exposed to these real solutions for real life problems, students discover on their own the part-whole relationship among core and peripheral technologies and find learning challenging as well as interesting.

3. Pedagogical Principles Behind the ITL Lab Concept

3.1 Integrated Training

There are two dimensions of integration in all the ITL labs. They are system integration and technology integration. System integration

refers to core technology combining with supporting peripheral units (see Figure 2), while technology integration means that in each lab, the core technology is combined with peripheral technologies from other labs (see the horizontal arrow indication in the three-tier model in Figure 1). In the PLC lab, for example, the students work on PLC modules to learn the core technology. At the same time, they also see other technologies like pneumatic control and sensor technology (the peripheral technology) being integrated as part of the mechatronics system.

Some of the peripheral technologies in PLC labs become the core technology in their own individual labs, and PLC in this case become the peripheral technology in other labs. The structure of system or technology integration makes learning meaningful for the following reasons:

- a. The better the information to be learned is organized, the more meaningful the learning will be (Theory of cognitive structure, Piaget),
- b. The amount of transfer between the familiar situation (the school environment) and the unfamiliar situation (the work environment) is determined by the number of elements that the two situations have in common (Theory of transfer of training, Thorndike).

3.2 Iterative Training with proximity in time and space

Each core technology can be used many times in other labs as peripheral technology in an integrated mechatronics system. Whatever the student does in the technology module, he or she can see the immediate consequence in the mechatronics system, right next to the core technology module. After being exposed to this kind of feedback providing to environment for multiple times, the chance for the student to repeat what they do in the lab again when they see a similar environment, is higher (Theory of Reinforcement, Skinner).

3.3 Situated Training

Students are encouraged to discover the variety of real life applications in technology integration, with no penalty for mistakes. Things to be discovered in the lab include new elements, new applications, and new ideas for technology integration from the real world (Theory of Situated Learning, Brown and Duguid, 1994).

3.4 Progressive Training

Technology and system integration, with a gradual increase in the level of complexity (from simple technology to complex technology and simple system to complex system), helps shape the student's skills step by step.

Since a complex skill consists of simpler forms of behavior, the teaching of complex skills should always start with the simple behavior leading to the complex ones (Theory of Shaping, Skinner).

4. Implementation of ITL Laboratories

The eight ITL laboratories in NYP are, machine elements, system peripherals, electro-pneumatic control, system building, FA-technology, motion control, machine vision, and robotic technology. The details of equipment used in the mechatronics system, and the industrial case studies in each lab are summarized in the table below.

Core Technology	Equipment used in mechatronics system	Industrial case studies
Robotic technology	Industrial robots and programming kits for robot operations and programming in pick-and-place, palletising, assembly, tool work and compliant task and vision guidance.	• Testing station for handling fragile parts • Station for testing of calculators • Assembly station with pick-on-the-move operation • Tending station for IC wafer • Assembly station for hard disk assembly • Assembly station using intelligent work carrier
Machine vision	Computers, frame grabbers, cameras, lightings, lenses and accessories for machine vision feasibility studies and image processing.	• Video monitor alignment • Automated compressor wiring insulation testing • Printed circuit board inspection system • TV-tube picture mask inspection system • Pin connector inspection • Keyboard making inspection system

Motion control	Computers, motors, drivers, motion sensors and mechanisms for industrial motor operations and control programming.	• Keyboard testing system • Remote controller testing system • Transformer coiling machine • Bar-code pen testing system • 2½ D engraving machine • IC palletising station
FA-technology	Computers, industrial programmable logic controllers and I/O simulation boxes for control programming.	• Part palletising system • Treatment process system • Packing and unpacking system • Discrete parts assembly system • Button head assembly system • Storage and retrieval system
System building	Computers, industrial programmable logic controllers (PLC) and I/O simulation boxes for PLC programming	• Battery handling system • Speaker screw checking machine • Bumper foot inspection and flipping machine • Color discrimination system • Rotary indexing system • Motorised transfer system
Electro-pneumatic control	Electro-pneumatics trainers, electro-hydraulics trainers and motor modules for electro-pneumatics/hydraulics control.	• Auto-palletising system • Rotary manipulator unit • Gantry manipulator unit • X-Z manipulator unit • Feeder and selector unit • Auto-pallet changer unit • Vertical rotary transfer unit • Lifter unit • Stamping unit • Part orientation unit • Multi-stopping unit • Work queuing unit • Indexing transfer unit
System peripherals	Machine elements, industrial components, materials and tools.	• Conveyor station • Indexer module • Hopper unit • End-effective module • Vibratory bowl feeder module
Machine elements	Machine elements, industrial components, materials and tools.	• Fastener assembly • Bearing assembly • Driving belt assembly • Linear bearing assembly • Gear assembly • Profile assembly

Figure 3

5. Preliminary Findings

Benefits	Problems	Suggested Strategies
• Provides integrated training. • Provides iterative training. • Provides situated training. • Provides progressive training.	• Competitive information sometimes makes weaker students lose the focus of learning, resulting in low motivation of learning. • Sometimes trouble shooting in industrial application case studies needs to take place before the expected learning behavior can occur.	1. • Highlight the focal points (expected behaviors) in the lab. • Break the focal points into smaller steps of behaviors, to increase the success rate of the behavior. • Provide positive reinforcement (recognition) when the expected behavior occurs. 2. • Highlight the potential problem areas and the relevant trouble shooting procedures to the students. • Lab tutors require substantial experiences in the industrial project work.

Figure 4

6. Conditions

There are three major conditions under which Integrated Learning and Teaching (ITL) concept were implemented in NYP for the labs in the School of Engineering. They are:

6.1 Industrial condition

NYP believes that technical education should reflect industrial needs. Mechatronics has been driven by these needs to design and manufacture cost-effective and high performance products like autofocus cameras, and programmable home appliances.

6.2 Environmental condition

The four contributing elements to the teaching excellence in NYP are people, system, capability, and network. Without these four elements, especially the teaching factory training system, there will be no ITL labs.

ITL lab concept is a pedagogical approach to support the teaching factory concept, set up a training system, utilize our staff, and get our students to work together on industrial projects. With this kind of system, our staff's capability is increased to attract even more challenging projects from the industry, resulting in an extended network with the industry we serve.

The pro-industry environment of NYP enables our staff to design and develop mechatronics systems as teaching aids in the ITL labs, and also to reproduce industrial case studies for teaching, from the industrial projects that we were involved in before. Capable staff and updated industrial projects are two critical factors for the successful implementation of ITL labs.

6.3 Pedagogical condition

In order to facilitate the learning of multi-disciplinary technology without any increase of time, a new pedagogical approach is required.

This approach has to utilize industrial case studies to teach the application of technology integration. This new lab concept features integrated training, iterative training, situated training, and progressive training, to maximize the transfer of learning.

7. Conclusion

Integrated Teaching and Learning environment is an effective approach to maximize the amount of transfer of learning, especially in the learning of multi-disciplinary technology, like Mechatronics. For it is a highly simulated environment where multi-disciplinary technology are integrated at multiple levels.

Reference

Mickey Chiang, *From Economic Debacle to Economic Miracle: The History and Development of Technical Education in Singapore*, KHL Printing Co. Pte Ltd, 1998

B.R.Hergenhahn, *An Introduction to Theories of Learning*, Prentice-Hall, Inc, Englewood Cliffs, New Jersey 07632, 1988

Edward Ho and Teo Khin Hiang, *Overview and Definition of Mechatronic Technology*, School of Engineering, Nanyang Polytechnic

Edward Ho and Teo Khin Hiang, *NYP's Innovation in Engineering Education: ITL Concept*, School of Engineering, Nanyang Polytechnic

Alison A. Carr, *Good Ideas to Foment Educational Revolution: The Role of Systemic Change in Advancing Situated Learning, Constructivism, and Feminist Pedagogy*, *Educational Technology*/January – February 1998

Linda Low, Toh Mun Heng, Soon Teck Wong, Tan Kong Yam, Helen Hughes, *Challenge and Response*, Times Academic Press, 1993.

[Summary of the Discussion]

Ma Genrong: The integrated-technology teaching is the trend of vocational education development. Experiments on the mechatronics training are also carried out in Shanghai. The problem lies in its relations with employment and how to adapt training to employment requirements.

Edward Ho: We encourage students to obtain the spirit of innovation through discovery and exploratory learning. This helps the students adapt themselves to the job market.

Lorenz: It's impossible for the school to, independently, carry out the high-tech education like mechatronics training. It must cooperate with some enterprises or companies. Can you briefly introduce the way you cooperate with companies and the solutions for expenditure?

Edward Ho: The equipment of training center is provided by companies, and the regular operation expenditure is provided by the government.

Country Report Thailand

Pavanuj Fungladda

(Department for Skill Development Ministry of Labor and Social Welfare)

The Situation of Vocational Education and Training in Thailand

1. The Situation of Vocational Education and Training in Thailand

The situation of vocational and training in Thailand is provided through both formal and non-formal system.

1.1 Formal system

The formal education system is classified into 4 levels:

- (a) primary level,
- (b) lower secondary level,
- (c) upper secondary level, and
- (d) University level

At the secondary level, there is an alternative for students who have finished lower secondary education to either continue their 3 years' general education that leads to the university entrance examination or change over to vocational education.

The vocational education comprises 2 levels: (a) secondary vocational education of 3 years' duration, and (b) higher level of 2 years' duration in a technical institute. Graduates from secondary vocational education are given certificates that enable them to secure suitable jobs or continue to further 2 years' vocational education and receive a diploma. To be qualified for a bachelor's degree, they have to study for 2 more years in a technical college or a teacher training college.

The majority of the formal institutes, both public and private, offer programmes at more than one level. Say, both certificate and diploma levels, or, in some institutes, the certificate, diploma, and degree levels.

These institutes offer 3 major branches of vocational education: the industrial, commerce, and agricultural occupations.

1.2 Non-formal system

Non-formal vocational training is organized by several ministries, the most important of which are the Ministry of Education through the Department of Vocational Education (DOVE), the Department of Non-formal Education (DNFE), and the Ministry of Labor and Social Welfare through the Department of Skill Development (DSD).

The DOVE provides non-formal courses of several durations (one year, 3 months, or less) in polytechnics and the Industrial and Community Education College (INCEC). The INCEC provides workshop-based practical courses for students in comprehensive secondary school. Mobile training units are attached to each Agricultural College to provide extension service to rural communities.

The DNFE provides non-formal programmes, both institutional and non-institutional, on basic vocational skill, skill upgrading and income generation and supplementation activities.

The DSD provides pre-employment training for new entrants to the labour market, skill upgrading training for employed persons, non-technical training, rural vocational training, and instructor training. It also classifies national skill standards and conducts skill testings and competitions.

There are other governmental organizations that conduct vocational training, such as the Ministry of Interior, the Ministry of Defence, the Ministry of Agriculture and Cooperatives, the Ministry of Industry, Bangkok Metropolitan Administration, and enterprises.

Several non-governmental organizations provide vocational training to help economically and socially disadvantaged people to improve their quality of life. Employment-related training is also organized by private vocational training institutes for those who can afford training fees.

2. Vocational Training by Department of Skill Development

2.1 Vocational training

The National Institute for Skill Development, Regional Institutes and Provincial Centers for Skill Development provide the following training programmes:

2.1.1 Pre-employment training

Full time basic training is provided to youths aged between 15-25 years who have left schools at the primary level or over. Training courses of 3-15 months are available with 20% theoretical part and 80% practical part. After the institutional training is over, the DSD, in collaboration with private firms, arranges in-plant training of 1-4 months for the trainees. A certificate is awarded at the completion of the in-plant training.

2.1.2 Skill upgrading training

More than 100 short courses are offered for workers who wish to acquire basic skill and more advanced skills to upgrade their proficiency and quality of life.

2.1.3 Rural vocational training

This training aims at equipping the people in rural area with basic vocational skills necessary for them to seek employment in local industry of services, or to acquire supplementary occupations during the dry season. Training courses in various technical fields are organized to improve the quality of rural labours to meet the demand of enterprises, and to enable agricultural workers to avoid off-season unemployment and earn supplementary income.

2.1.4 Non-technical vocational training

Apart from various technical training courses, the DSD also organizes training courses in non-technical field like entrepreneurship and other service occupations such as secretary, receptionist, waiter/waitress and other basic business skills for small business operation. The duration of each course ranges from 15 to 120 hours.

2.2 Occupational Skill Standards Promotion

2.2.1 National Skill Standards Setting

Skill standards setting is the classification of vocational skill in accordance with the level of knowledge and proficiency required in performing each occupation. The National Skill Standards of Thailand is classified by the National Skill Standards Committee comprising qualified specialists in technical fields from the government, the private sector, educational institutions, and other related organizations, which the DSD serving as its secretariat.

The national skill standards are classified into 3 grades starting from the lowest first grade to the highest third grade. The national skill standards serve as the guidelines for private firms in recruiting their personnel and setting up salary rate. For government agencies, the national skill standard is regarded as an effective instrument in designing educational curriculum, conducting courses, and occupational guidance.

2.2.2 Skill Standards Testing

The DSD conducts skill testing for skilled workers in fields that have already been classified by national skill standards. Skills testing can be an incentive for skilled workers to increase their productivity and facilitate the performance of personnel management function like position classification, personnel placement, and promotion. The DSD in collaboration with international bodies, also participate in international skill competitions.

2.3 Development of training personnel

The main activities are to organize study, do research and develop instructor training system in various trades including the skill training of personnel in the government and private sectors.

2.4 Development of training technology

The DSD undertakes the studies, analysis and does research to develop appropriate training technology, training curriculum, training equipment, training materials and training aids in advanced technology.

3. Problems

3.1 The lack of labor market information

Skills training should be linked with the demands in the labor market and potential employees' needs. The majority of the DSD institutions/centers do not have information on the demand for skill labor. There is no systematic dissemination of labor market information and no formal mechanism for obtaining such information. In contrast, a number of institutions used informal contacts with local employers, supplemented by sources such as newspaper advertisements, to evaluate the relevancy of their programs and to make minor modifications to their courses.

The lack of labor market information is one of the major constraints on career guidance, skills training and job placement in Thailand. Employers do not have access to information on prospective employees, who, in turn, have no notion of the occupational options available to them or how training can increase their choices. A large population is also unaware of training courses offered by newly created DSD institutes/centers.

3.2 No national career guidance and job placement system

The Ministry of Labor and Social Welfare is required to play a more effective role in monitoring labor market information. The Ministry needs to monitor the skill requirements where new job opportunities are likely to arise out of the economic transition. Students and school leavers would need to be prepared for such new opportunities with training for new job.

There is a need for DSD to provide career counseling and job placement services to potential employees. It is necessary for the government to develop a capacity in career counseling so that students and job seekers have an idea on what type of skill are in demand in the labor market. Career counselors should be able to provide information on education and occupational choices for schools individuals and parents of potential employees. Once potential employees have the requisite skill, assistance in locating a job should be a concern of the government. DSD should make efforts to find out job vacancies for graduates of training programs.

There is a need for supply of skilled workers to enterprises. DSD is required to make an effort in promoting job opportunities for trainees who complete their programs. It is imperative that the government establish linkages with private sector employers and with potential employees. Once these linkages are established, the need of the private sector, in terms of required skills, and the qualifications of job seekers will be better understood. Based on up-to-date labor market data, DSD needs to guide education and training programs. It will advise educational and training institutes to abolish courses for which demand is in declining and start new courses for which demand is growing.

3.3 No vocational education and training quality assurance

Many government and private organization have the duties of vocational training. Each designed the curriculum and did not share the opinion with each other. There is difference of training investment, which causes difference of vocational education and training quality.

The training has the good quality that means every step in the process of training should have the quality, curriculum, machine equipment, tools etc.

The Department of Skill Development has a committee that sets standard skill testing, curriculum. But without forcing private sector to follow the standard skill testing, we try to promote private sector to train their employees or new labor. By the act of promotion skill training, 1994 (2537 B.E.) employers will benefit from the training of employees or new labors, curriculum, equipment and machine, loan, and even the instructor or exchanging instructor project. If the employer trains the employee, he will pay income tax less than those who have no expense on training employee or employees. DSD tries to promote the employer for giving the chance to the employee for skill standard testing. The employer that has skill workers means that his product will be of good quality.

D.S.D. pre-employment training, we proposed that at the end of training the trainee should have skill lowest possible at skill standard level 1.

D.S.D. pay attention to vocational training by training the instructor as much as we can, and providee teaching aids. Every year the committee will select the best institute and the best center and give the

awards. The award-winners should have good team work, good output, good management.

For designing the curriculum and skill standard trade, D.S.D. invites the private sector to join the committee that responds to the market demand and the trainees can get jobs.

3.4 The poverty makes trainees drop out

The target groups that come to be the trainees in pre-employment courses in regional institute or center are very poor. Their families are farmers, some parents are unskill labors, with low income, no saving money, so they can not support their children till the completion of the courses.

The trainees can not succeed the courses means the training is wasted and a failure. D.S.D. tries to solve this problem. We required the budget from government to construct dormitories for trainees, free of charge, which was funded by government or foundation. Institutes/Centers usually are in big cities or tourist cities. The officials try to find extra jobs on holiday for the trainees to earn some money for living and finish full courses. That makes good opportunities for them to get a job and improve quality of life.

3.5 The difficulties of teaching or instructing the trainees

Some trainees come from poor family, and are of low education. Some training courses are short, but not easy and need good basic education, so it makes instructor face the problem of making trainees to understand and practice the exercises or skills. It is a hard work, but instructors must try to do the best to help all the trainees.

We advise them to study further by non-formal system. When they finish training and can get job, earning money while learning in free time will bring them good chances for future. We coordinate with Department of Non-Formal Education to teach the trainees while they stay in our dormitories. That makes the trainees finish higher education by using time less than learning by formal education system.

3.6 The rapid change of technology

The vocational training for careers need to adjust to response of the

market's demand. The qualified labor on market demand should have many skills, more techniques. Now the technology has developed. Industries use new technology. So vocational training should have new machines, new equipment, new tools that are modern and up-to-dated.

DSD is a government organization. We get the budget from government. But it is not easy to changing the way of training and get the money for equipment, machines, tools. We ask for the budget this year and may get it one year or two later, so we have to save the budget, and can not follow the industries.

DSD set the project of loaning from Asian Development Bank for providing new machines, tools, equipment and training the instructors for developing system.

3.7 Lack of working habit or industrial habit

By follow-up and evaluate the vocational training, we get the information from industries that workers include DSD trainees lack of working habit or industrial habit such as, being not punctual, always absent, for they come from agricultural sector that should improve and try to get used to industrial habits.

DSD try to improve this problem. We designed the activities on making working habit and try to insert between the pre-employment trainings.

4. Scientific Research on the Subject of Vocational Education and Training, Topics and Forms of Topics and Forms of Research and Its Influence on the Actual Development of Vocational Education and Training

D.S.D. does the research in the form of follow-up and evaluate the result of pre-employment training courses. We would like to know if the trainees can get a job immediately, or how long after to complete training, and how about the income or salary, besides, what to do about improving the training efficiency.

Institutes/Centers/Technical Studies and Planning Division get information by sending the questionnaires to the trainees after succeeding the course 3 months or more. And we get information from

firms or industries which we sent the trainees for in-plant training. Then we improve pre-employment training courses according to their demand.

But the last two years, D.S.D. signed the contract with 2 organizations for doing the research:

1. Faculty of Social Welfare, Thammasat University, Bangkok, Thailand.
2. Thai Development and Research Institute. N.G.O.

4.1 The result of research

4.1.1 Faculty of social welfare

Follow up the employment of pre-employment training course trainees and rural training course trainees in 1995:

- 1) Most of the trainees are male and single, received basic education from primary schools. Not many trainees who can continue their study in non-formal education or vocational education.
- 2) The trainees can earn more income and get better quality of life.
- 3) The opinion of trainees: Training; curriculum, building (workshop) machines, tools, equipments, instructors are good enough.
- 4) Most of the trainees' problems during training are the poverty of trainees.
- 5) The training project will be worthwhile in 2 years.
- 6) There is no suitable training in some areas.
- 7) Evaluation of curriculum should do at every half plan for developing training according to the market demand.
- 8) The opinion of the employer about the qualification of employee will be the trend for trainees to get chances for jobs and better life.

The labor market demands and prompts entrepreneurs in Thailand to participate with government in developing skilled labors, 1997-2001:

- 1) Changeable of service methodology:

DSD has to change the method of service from coping with the situation to go forward, such as:

- Setting information service centers to give service approaches to people and enterprises for their convenience without going to the government offices. For example; the information for seeking jobs,

training or new technology.

- Service to promotion for enterprises by designing packages of training curriculum specially for enterprises's requirements, sending expert team to support the enterprises which lack of instructors.

4.1.2 Incentives to companies to provide training

We should have a campaign to push entrepreneurs to pay attention to good co-operation.

Many entrepreneurs are still not ready and the government should give more incentives, including income tax exemptions. For example: the honorable certificate, tax exemption for importing new machines.

4.1.3 Public relation

We should pay attention to supporting the budget for public relations, scatter the vocational training courses that should be beneficial to the enterprises.

5. New Tendencies of Development in the Field of Vocational and Training

5.1 To encourage the private sector in developing skill labor

5.1.1 The Vocational Training Promotion Act, 1994

The purpose of this Act is to encourage private enterprises to provide pre-employment training for employable people and to arrange skill upgrading training for their employees. This Act also encourages the close cooperation between enterprises and educational institutes in organizing apprenticeship training for students. Providers of training under this Act are entitled to certain privileges in forms of technical advisory services from DSD and income tax exemption.

5.1.2 The establishment of private vocational training institutes

In an attempt to solve labor shortage problem, the Ministry of Finance, the Ministry of Education, the Ministry of University Affairs, and the Ministry of Labor and Social Welfare put forward the policy to encourage private sector investment in human resource development.

Such policy can be implemented as follows:

- (1) The establishment of skill development foundation.
- (2) The establishment of company-based training centers.
- (3) The permission granted to employees to study or attend training courses.
- (4) The establishment of private vocational training institutes

Such incentive as tax concession is provided for the entrepreneurs or enterprises taking any of above measures. The investor who wants to establish a private vocational training institute can request a low-interest loan from the Committee for Supporting the Establishment of Private Educational and Training Institutes through the Department of Skill Development.

5.1.3 The Skill Development Fund

The Department of Skill Development is preparing to set up a Skill Development Fund as a means of promoting training activities. The purpose of the Fund is to provide concessional loans for employment-related training of new entrants to the labor market, employed persons demand for skill upgrading, and laid-off employees. The employer making a contribution to the Fund and becomes its member can also apply for the loan for in-plant training activity.

5.2 To develop skill of women and children to secure occupational competence and sufficient earnings

Now women play important role of working and will be the big part of work force. But Thai value, the same as other Asian countries, employers employ women are only words. They don't agree that women can work like men, such as electrician, air conditioner repair and maintenance worker, welder, brick-layer, etc. Some can work difficult job like men perhaps better than men, because they are elaborate. But women are overlooked and denied of their capabilities. They require training course about cooking, dress-making, etc.

D.S.D tries to change this value and create new jobs that are suitable for women, design new curriculum, make new projects, coordinate with private sectors and N.G.O.'s

5.3 To promote and encourage the small and medium industries for training employees

Now the economy of Thailand is regressive. Large industries reduce production and reduce employment. Some businesses can not run and close down. But small and medium industries still firm and this is a good chance of training labor for the growth of economy in the near future. At that time with the changes of technology, factories will become smaller, needing labors of medium or high level skills and of full capacity.

By the Vocational Training Act, 1994, DSD thinks that can encourage private enterprises to provide pre-employment training courses and upgrading training course for their employees.

DSD try to develop upgrading training course and train the unemployed for running his or her own business, and can employ more than one man to work with, that can reduce the number of unemployment.

5.4 To promote and expand vocational training course to rural areas

In dry season the people in agricultural sector are always free and unemployed. So D.S.D. tries to organize mobile training and move to the rural area. The people shall be trained and have more skills that can help them earn more income and prepare to work in the factories. For Board of Investment of Thailand try to persuade the entrepreneurs to invest in the rural areas, by giving more incentives, government constructs infra-structure, expands the growth to rural areas. That can reduce the rate of unemployment by go to towns from agricultural sector. So people can have work in their hometowns, live with their families and have good quality of life.

5.5 To promote long life leaning

5.5.1 Computer Based Training (C.B.T.)

D.S.D. designs vocational training curriculum for the trainees and they can train themselves by computer, which has many exercises for practicing and can evaluate their performance. Training can be conducted slowly or quickly, depending on their abilities.

5.5.2 Expansion of Computer Unit Training

Every institute or center will have computer units duplicate the curriculum, produce CD-ROM and experiment the remote-distance training system and set the information of skill development system.

5.5.3 Promotion upgrading course, high education while working

By remote-distance training system, the credits of training can be transferred to formal system. The employees will upgrade their levels of education and have opportunities for promotion and income.

[Summary of the Discussion]

Lorenz: How to define the "Formal Education" and "Non-Formal Education" mentioned in the report? How many people can go directly to work after accomplishing the education?

Fungladda: There is no concrete information data to separate the Formal Education from the Non-Formal Education. Generally speaking, the former is conducted in the urban area and the latter is conducted in the rural area. In the cities, 80% will enter the universities because the enterprises have created demands for the high level intellectuals to meet high-tech requirements. In the countryside, on the contrary, most will take up Non-Formal Education.

Edward Ho: All the Formal Education forms in the report have got the fixed number of years but the Non-Formal Education forms haven't got it. Why?

Fungladda: The Non-Formal Education is a kind of open education graded by academic credits. The time is flexible but at most ten years.

Special Report

Prof. Fu Hung Yuan

(Department of Business Education College of Vocational & Technical Education, Changhua University of Education)

A Technological and Vocational Education Perspective: Past, Present and Future in Taiwan

1. Introduction

Nothing in life is more certain than change. All living things grow, mature, and die. Some exist for hours, some for days, some for weeks, some for months, and some for many years. All, however, are changing constantly, even though the changes may not be readily apparent. The only unknowns are the direction and the rate of the changes.

Change is ever present in education, also. Goals and expectations of education professionals differ from one period of time to another. So do the aspirations and objectives of students and their parents. Needs and desires of employers do not remain constant, either. Vocational education is especially subject to changes taking place in society because of its unique mission. Therefore, it may be useful to take a look at where vocational education has been, where it is now, and where it may tomorrow.

2. The Search for Identity

What kind of education, for what purpose, and for whom? These are age-old questions faced by all educators since the creation of the first organized school. The questions never change over time, but the answers do. There is a never-ending search by each segment of the education establishment to find its own place in the sun. Typically, the greatest prestige seems to go to those subject fields that were offered first in the schools. They acquire a position of preeminence from which it is very difficult to be dislodged. New fields of study or new courses must fight for a place in the established order. They must justify their right to exist in ways that the early arrivals were not required to do.

So it has been with the study of education for vocation whether at the high school, the post-secondary school, or the collegiate level. Only in very recent years has vocational education begun to be accepted as an equal among the established academic disciplines in colleges and universities. In the senior high school, vocational education still does not enjoy equal standing with the college preparatory subjects. The search has been for an identity that has significance and lasting value.

The Government of Taiwan including the local governments place a high value on education. Taiwan's constitution requires that 15 percent of the annual central government's budget be spent on education, science, and culture. Therefore, as Taiwan's budget increases so do the dollars spent on education. Education in Taiwan is regarded as an instrument of the overall national policy. The master plan for vocational education in Taiwan corresponds with Taiwan's priority for economic development.

One of the major factors contributing to Taiwan's successful economic development in Taiwan, during the 1980's is the quality and quantity of the well-educated and highly-skilled work force provided by Taiwan's vocational education schools and vocational training institutions during the past four decades. Traditionally, the master plan for vocation in Taiwan has responded to the nation's priority for economic development. However, as a result of social changes and economic development, vocational education is facing many challenges.

The current vocational education system in Taiwan originated in the 1950's. This early stage of vocational education focused on teacher education and curriculum planning and development. To upgrade vocational education in secondary schools, teacher education programs for industrial and agricultural education were established in the universities. In curriculum development, the unit trade vocational education curriculum was adopted. The results from a census and study of industrial occupations and trades were used to develop programs, objectives and instructional contents for vocational education.

This formed a basis for the expansion and transformation of vocational education which began in the 1960's. During this period, a special fund - the development of vocational education, was created to add new programs and facilities to the major provincial vocational schools. The Ministry of Education published the curriculum

guidelines for vocational education. Many private and independent vocational schools were also established this period. Most of these private vocational schools offer vocational industrial and business programs. During the late 60's, the most popular program added to the vocational education in both public and private vocational schools was electronics. The vocational education system was able to meet the demand and provide the large number of electronics technicians needed by the infant, but fast growing electronics industry.

The 1970's became the turning point for Taiwan's vocational education. The public free education was extended from six years of elementary school education, to include an additional three years of junior high school. Vocational education at the junior high level was phased out. The new policy for public education placed all vocational education at the senior high level, which required reevaluation and adjustment of all vocational education programs including their objectives, curricula, teaching methods, and teacher preparation. The Vocational Education Curriculum Standards were revised in 1974 in six major vocational education areas: agricultural, industrial, business, home economics, health and nursing, marine and fishery. The new curriculum guidelines for vocational industrial education stressed the technical core courses and shop practices, and eliminated unnecessary duplication in course offerings.

To supply the manpower at the technician level for the nation's major construction and industrial projects, vocational industrial education was placed at the highest priority in funding for vocational education. New vocational industrial schools funded by the government were built in major cities and counties. Senior academic high schools with local conditions and demand for vocational education were converted into comprehensive high schools with industrial and business education programs. Vocational agricultural and vocational business schools were adding industrial subjects to become vocational industrial-agricultural schools and vocational industrial-business schools. The rapid expansion of vocational education created a severe shortage of teachers. To recruit and train qualified teachers for vocational education, a new teacher college was founded in Taiwan to prepare teachers for vocational industrial, vocational business education and vocational counseling. The new teacher's college admitted only the graduates from vocational schools.

The programs and enrollment in the vocational education has

steadily increased during this decade. By 1980, the enrollment in vocational education programs accounted for 68 percent of the total secondary schools' enrollment, and the students enrolled in vocational industrial schools exceeded 50 percent of total vocational school enrollment.

Vocational education in Taiwan entered its fourth decade with constant growth and expansion in industrial, business and other trade areas. The major tasks of vocational education in the 1980's are program integration, curriculum upgrading, and in-service teacher training. New curriculum and instructional methods are also being introduced. Cluster courses and competency-based instruction have become the main theme of the vocational education curriculum planning and development. To achieve these instructional goals, vocational education teachers and administrators define course contents, develop objectives, and prepare course materials and educational media for the successful implementation of competency-based instruction. Vocational education teachers are encouraged to attend in-service training in their field, which include seminars, workshops, graduate courses, and study abroad. Universities offer graduate professional and technical courses. A majority of vocational industrial education teachers attend graduate classes in the Graduate Institute of Industrial Education at Taiwan Normal University during the summer.

3. Current Status of Vocational Education

Technological and Vocational Education in Taiwan is provided at three levels, senior vocational schools, junior colleges and institutes/universities of technology. Additionally, a project is currently under way to provide technical programs at the junior high school level. Its purpose is to enable students to gain an earlier awareness of their interests and aptitudes and to cultivate these interests accordingly. At the upper-secondary school level, an experimental program of comprehensive education, which includes vocational programs, has been conducted.

Programs in senior vocational schools are divided into daytime and evening divisions, cooperative education programs, technical programs, special technical programs and supplementary programs. The Junior college system is divided into two types, two-year and five-year programs. The two-year programs also offer evening programs, for

which the period of study is at least one year longer than for day programs. Institutes/universities of technology have undergraduate, Master's and doctoral programs.

Undergraduate programs are two-year and four-year, and are also open to individuals in the workforce.

3.1 Junior-High Technical Programs

Goals. The junior-high technical program is geared towards junior high school students whose academic aptitudes are not clearly identified, who are unwilling to continue formal education or who are more practically-oriented. It is designed to give them the opportunity before leaving school to acquire an employable skill, go on to senior technical programs, or resume their education at senior vocational schools or five-year junior colleges.

Programs. In accordance with "The Plan for Development and Improvement of Junior-high School Technical Programs - Moving towards 10-year Compulsory Education," the following programs are offered:

1. Vocational exploration and guidance: held during the second semester of the eighth grade, these programs help students gain an understanding of their own interests and aptitudes as well as give them an introduction to the world of work and to the programs available in senior vocational schools.
2. Technical courses: aimed at ninth graders intending to enter employment, these courses are held six to fourteen hours a week for one year, and students are guided towards further study in the senior-high technical programs at senior vocational schools.
3. Special technical courses: aimed at eighth and ninth graders who have minor learning difficulties, these technical courses improve students' employment prospects and guide them towards further study in special technical programs at senior vocational schools.

The technical programs and special technical programs, including courses currently being planned and those already in place, are as follows:

1. Cooperation programs: these programs are jointly offered by junior high schools, five-year colleges and vocational training centers, or

through cooperation between different junior high schools.

2. **School-based programs:** These programs are run by junior high schools themselves.
3. **Delegated programs:** senior vocational schools, five-year junior colleges and vocational training centers are commissioned to administer these programs. In addition, technical education centers run by junior high and senior vocational schools offer a wide variety of technical courses to students residing in specific districts.

Curriculum. The nature of the curricula for technical programs is dependent on factors such as course contents, teaching methods and class times. However, each curriculum has the following characteristics: (1) Schools design the programs themselves. (2) Practical training is emphasized. (3) Students may receive technical training outside school in the latter half of the ninth grade. (4) Students are not required to study (or are allowed to take fewer hours of) English, mathematics, physics and chemistry.

3.2 Senior Vocational School Education

Goals. To provide students with entry-level knowledge and to develop a workforce which possesses both good work ethics and a sound foundation of basic technical skills.

Programs. Most senior vocational programs are provided by senior vocational schools, although some senior high schools also offer vocational programs. To suit the varying requirements of students, six different kinds of programs are offered at this level.

1. **Daytime programs:** these are for junior high school graduates and last for three years. On completion of one of these programs, qualified students receive a diploma.
2. **Evening programs:** also for junior high school graduates and lasting for four years. A diploma is given to qualified students on completion of one of these programs.
3. **Cooperative education programs:** these are administered by schools in cooperation with companies. To gain admission, junior high school graduates need to pass both an entrance examination and an interview given by a company. Programs usually last for three years, with the school responsible for providing theoretical courses while the company provides practical experience.

4. Technical programs: these programs are designed to provide junior high school graduates who do not intend to continue their formal education with an opportunity to learn marketable skills. Students register and attend one-year, two-year, or three-year programs respectively. Certificates are issued to qualified students at the end of each program, but students receive a certificate verifying completion of the course at the end of a three-year program. Those who complete a three-year program and pass a qualification exam receive a certificate equivalent to a senior vocational school diploma.
5. Special technical programs: begun during the 1994-95 academic year, these programs offer regular three-year courses and one-year junior-high technical programs. Junior high school graduates with minor learning difficulties are given an opportunity to acquire skills. Candidates are selected for admission.
6. Supplementary education programs: These programs are designed to meet the needs of junior high school graduates who are currently employed or plan to begin a career, so there is no restriction for admission. Most classes are held in the evening, and students who complete a three-year program and pass an examination are issued a certificate equivalent to a senior vocational school diploma.

Furthermore, in order to help students develop fully and to satisfy the demand for qualified technical personnel, beginning with the 1996-97 academic year, an experimental comprehensive high school system was established at the upper-secondary level, with academic and vocational programs being offered at the same school. In the first year, there is a core curriculum, followed by a year of exploration. Finally, in the 12th grade, students specialize in various disciplines. In this way, students receive guidance in choosing courses that suit their interests and aptitudes.

Curriculum. Every senior vocational school provides approximately 35 contact hours per week, and each semester lasts 18 weeks. The curriculum is structured as follows:

1. General subjects: these include Chinese, English, mathematics, general social sciences and others, taking up about 30% of total class time.
2. Technical subjects: these include technical theory and practical experience and account for around 60% of the class hours.

3. Electives: these occupy between 5 and 10% of class time.
4. Physical education: this takes up some 5% of the total class hours.

3.3 Junior College

Goals. To teach applied sciences and technology, and to turn out a workforce with mid-level technical or managerial skills.

Programs. Programs at junior colleges are divided into five-year and two-year systems, including daytime and evening divisions and special supplementary programs.

1. Five-year programs: these programs have only daytime courses and are designed for junior high school graduates. Courses last for five years, except in the case of certain subjects, which may be extended to six years.
2. Two-year programs: these programs offer daytime, evening and supplementary courses, and are designed for students who have graduated from senior vocational schools or who have reached an equivalent academic level. The study period is normally two years.
3. Since the 1996-97 academic year, some prestigious junior colleges have been allowed to change to institutes of technology. These institutes are required to continue their junior college programs to prepare mid-level practical workers.

Curriculum. The junior college curriculum follows the academic year and credit system and is divided into general subjects (25%), vocational foundation subjects (10%), and vocational core subjects (25%). The remaining 40% of the curriculum is designed according to the individual requirements of schools. In order for students to graduate, 220 credits are the requirement in the five-year system, and 80 credits are required in the two-year system.

3.4 Institutes/Universities of Technology

Goals. To develop a higher level workforce for the fields of technology, engineering, and management.

Programs. Institutes/universities of technology provide the highest levels of Technological and Vocational Education. Under graduate programs, master's and doctorates are offered.

1. Undergraduate programs

- 1). Four-year programs: courses are divided into daytime and supplementary programs. Daytime programs are aimed at senior vocational school graduates or students who have reached an equivalent level and last for four years. Supplementary programs are designed for people who have been employed for more than one year, and the period of study is five years. A bachelor's degree is conferred on completion of the program.
- 2). Two-year programs: courses are divided into daytime and supplementary programs. Daytime programs are aimed at graduates of junior colleges and last for two years. Supplementary programs are designed for people who have been employed for more than one year, and the period of study is three years. A bachelor's degree is conferred on completion of the program.

2. Master's programs

These programs are aimed at individuals who hold Bachelor's degrees from universities or institutes of technology or who have reached an equivalent academic level. Courses last for one to four years. A Master's degree is conferred on students who have completed courses, submitted a Master's thesis and passed an examination.

3. Doctoral programs

Individuals who have completed a Master's program at a university of institute/university of technology may be admitted to a doctoral program, which lasts from two to seven years. A Doctorate is conferred on a student who has completed courses, undergone a screening process for doctoral candidates, submitted a dissertation and passed an examination.

Curriculum. Each institute/university designs its own programs according to its particular characteristics. Following the academic year and credit system, each semester lasts a minimum of 18 weeks. One course credit per hour per week is given for completed courses. In practical courses, one course credit per two to three hours per week is given for completed courses. To graduate, students must complete a minimum of 136 credits in four-year programs and a minimum of 72 credits in two-year programs. In Master's programs, at least 24 credits and submission of a thesis are the graduation requirement, and the requirement for a doctorate is 18 credits plus submission of a

dissertation.

4. Beyond Tomorrow

4.1 Changes taking place in the world

A major responsibility of schools of the future will be to prepare students to enter a rapidly changing job market. Schools will be responsible for preparing students who are more adaptable and able to respond quickly to the requirements of new technologies. By the year 2000, workers' jobs will change dramatically every 5 to 10 years. It will be necessary for schools to train both youth and adults; adults will need to be reeducated and retrained when business and industry update operations. Adults will need retraining periodically because each new job will be different from the previous one.

Many advances and changes will occur by the year 2000 that have implications for schools. These include technological advances and labor market changes as well as sociological developments in America, but they can work as reference for Taiwan.

Technological advances: (Wingo, 1987)

- Space stations will serve as gateways for further exploration.
- Airplanes will fly from New York to Tokyo in 145 minutes.
- Highly computerized cars will be built to last a quarter of a century.
- New ultralight, ultrastrong materials will be available, with great potential for superconductors.
- Weather will be modified - hurricanes will be defused, cloud covers generated over scorched areas, and rain brought to deserts.
- Geneticists will reshape life forms, wiping out many diseases and afflictions.
- Computers and other devices will be driven by and respond to voice commands.
- Over 60 percent of American homes will have computers, compared to 18 percent presently.
- Scientific advances will lead to expanded knowledge—the total knowledge of mankind will double every 7-8 years.
- The information revolution will double, artificial intelligence will be common, and biotechnology will progress significantly. (pp. 68-72)

Labor market changes

There will be many labor market changes by the year 2000 which will affect business programs:

- Women will cover 50 percent of the work force, up from 43 percent, and minorities will increase to 15 percent from 10 percent in 1980.
- A 32-hour work week will be common, with some going to a 20-hour week.
- Small businesses will abound, and entrepreneurship will grow.
- From 25-35 percent of present jobs will become obsolete, because of technology. Many jobs will disappear from the workplace. The age of "new jobs" will evolve because of new technologies, with over 25 million new jobs (Cetron, et al. 1985).
- Over 75 percent of new jobs will be in service and information industries, with over half of them for unskilled service workers. The five largest growth areas will be: (1) janitors, (2) nurses aides and orderlies, (3) sales clerks, (4) waiters and waitresses, and (5) cashiers (Hay, 1984).

Sociological changes

Many changes of a sociological nature will influence educational programs.

- Life expectancy will reach 87 for women, and 80 for men.
- Participatory management style and patterns will become even more common.
- The population of America will surpass 280 million.
- Changes in family patterns will occur. One of four children will spend a portion of his/her school years in a family unit that was unknown a few years ago. That is, one of four children will come from a "blended" or aggregate family—one divorced parent with a child, married to another divorced parent with a child. By 1990 the average American will have been through a divorce (Hay, 1984).
- One of every three Americans will be part of a poor minority group.
- Only three workers will support each retired person. By comparison, in 1950, 17 Americans were working for each retired person (Hornbeck, 1986).

Clearly, the world in which the young people we teach will be living in a different world. The workplace is changing, the family and community are changing, and those who teach in the schools have to provide the kinds of experiences that will enable students to be successful as citizens and in the workplace.

4.2 Implications for technological and vocational education

Taking into account what is known about the past and the present, some future directions for Technological and Vocational Education seem apparent. There is an assumption, of course, that Technological and Vocational Education will continue to perform the dual function of providing both general and job-oriented education. While they may not provide general education themselves, it is the duty of vocational educators to design curriculums that ensure a sensible, broad general education for all students. Most of what needs to be done in education for business applies to all levels of study, although the depth and complexity of the work will certainly be different at each level. The business offerings must be practical and related to the workplace outside the school, but they must also be broad enough to enable students to adapt quickly to change.

What kinds of competencies are needed for the future? They probably are the same ones people have always needed in order to adapt to constantly changing environments. At the very least, vocational educators of the future must make certain that their students: (Hall, 1990)

- Learn about cultures other than their own.
- Know something about the history, geography, politics, and economy of countries and regions outside their own and can locate them on map.
- Are able to communicate reasonably well both orally and in writing.
- Have at least one specific job skill that will enable them to be productive immediately.
- Have experience working with others.
- Learn how to resolve conflicts in work settings.
- Develop an attitude of pride in workmanship.
- Develop critical-thinking and decision-making skills.
- Know how to work independently and to take initiative in their work.
- Know how business in general operates and what the environmental constraints are.
- Know that it is normal to have to learn new things on the job almost all the time.
- Learn the importance of service to the "customer" no matter what the job.

- Understand that additional formal or informal education will be necessary.
- Have basic computer skills to input, output, and disseminate information. (p. 10)

According to the previous analysis and discussions, we believe that the implications for education for technology and vocation are as follows:

- No longer will Taiwan be a blue collar/white collar society - Taiwan will be a society of high tech, information, and service industries.
- As high tech becomes more specific, education will become more general and flexible. Most of the graduates from education programs will have three to six separate careers.
- There will be a continuing emphasis on basics in schools, which will make it increasingly difficult to offer business programs in the public schools.
- Vocational education will prepare students for careers of change and challenge, rather than just for a first-level job.
- There will be an increased emphasis on oral communication skills, as voice-activated machines become more commonly used.
- Schools will become more of a year-round operation with flexible scheduling, day and night classes, and even weekend and summer programs.
- Education will be a lifelong activity - learning and preparation will not end with a degree.
- With the increased concern for accountability and assessment, there will be movement to more standardized testing, with focus on competencies, more centralized curriculum control, and teaching and learning for certain test.
- A closer working relationship will develop between business/industry, government, and education in an attempt to meet the pressing needs of students and the workplace. The increasing costs of education and the necessity of joint funding will further augment this community relationship.

All of these issues, and probably many more, pose enormous challenges for Taiwan education in the years ahead. However, when we reflect upon our own experiences, the most exciting and productive times are those when we have been heavily involved with changes. The 21st century clearly offers exciting changes and opportunities for

those of us who work in education for technology and vocation.

Reference:

Cetron, Marvin, et al. (1985, August). School of the future. The Futurist, 18-23.

Chen, Kuang-Ku (1998). The principles of technical and vocational business education. Taiwan Changhua: Fu Wen Books Co.

Chang, Frank Tien-Jin. (1986). Taiwan industrial vocational education: the personnel development program. AVA & IVETA International Conference Presentation. (ERIC Document Reproduction Service No. ED 276859).

Department of Technical and Vocational Education, Ministry of Education. (1983). An introduction to technical and vocational education of the Republic of China.

Taiwan Taipei: National Institute of Educational Information. (1998). An introduction to technical and vocational education in Chinese Taipei. Taiwan Taipei: National Institute of Educational Information.

Hall, J. Curtis (1990). A business education perspective: past, present, future. In S. L. O'neil (Ed.), Strategic Planning for the 1990's, National Business Education Yearbook, No. 28. (pp. 1-11). Reston, VA: National Business Education Association.

Hay, Leroy (1984, May). A futurist's view of American education. Instructional Innovator, 12-48.

Hornbeck, Danial W. (1986, November-December). Education in the year 2000. Journal of State Government, 162-63.

Land, Ming H. (1976). Anew Era of Vocational Education in Taiwan. School Shop, 36(1), 50-51.

Wingo, Walter (1987, September). What is ahead for tomorrow. Nation's Business, 68-72.

[Summary of the Discussion]

Meng Guangping: As one of the founders of Changhua Normal University, Professor Yuan Fuhong has given us a very enlightening report. Many questions in the report are of common interests.

Ikhyun Shin: In Taiwan, 60% people of the same age group are receiving vocational education. Is it part of the government's plan?

Fu Hung Yuan: The government adjusts and controls the ratio to encourage people to go to vocational schools.

Liu Chunsheng: What has the Taiwan authority done to solve the problems concerning vocational education?

Fu Hung Yuan: Now the number of universities in Taiwan is large enough to meet the enrollment demand from almost all the high school graduates. However, the gap between the general higher education and the professional requirements is enlarged. For example, a medical university graduate has to take extra examinations to get a doctor license and a graduate of accounting has to take extra examinations to get the accountant certificate. Favorable policies for vocational students include: 1) After serving for a certain period of time (usually two years), a five-year junior college graduate can directly enroll in an institute to study for the master's degree. 2) Graduates with B-Class certificate and C-Class certificate can get a college certificate after serving for respectively three years and four years.

Special Report

Prof. Kuang Ku Chen (Ph. D.)

**(Department of Business Education College of Vocational &
Technical Education Changhua University of Education)**

Internationalizing Business Education Programs: The Evolving Vision of Education For and About Business

1. Introduction

Taiwan, one of the leaders in Asian commerce and trade, has witnessed the erosion of its global market share during the past two decades. To reestablish their position in the global economy, business and government sectors of Taiwan must respond to international competition in the marketplace.

The competitiveness of Taiwan lies in a skilled, adaptable, and innovative workforce that responds with an expanding vision to a shrinking world. Where global education is a priority, institutions educate learners for the world they are entering rather than for the one they are leaving. A purpose of global education is to prepare a workforce with competencies to support a better quality of life for all human beings. Both the characteristics of the global marketplace and the contributions of education for that environment must be considered when formulating a model for business education with a global emphasis.

In the 21st century, the mission of business education - to teach For and About business - will continue as the fundamental basis of instruction in business. Business education prepares learners to make wise personal economic and career choices while developing knowledge, skills, and attitudes necessary to succeed in the workforce.

Education about business means instruction on various roles all learners will play as economically literate citizens. This instruction includes personal consumer economic skills, a knowledge of social and government responsibility, and an understanding of business operations. Learning about business also means developing interpersonal and

leadership skills for functioning in multicultural business settings. Preparation for business means building on the general understanding about business in a way that prepares learners to be employed in a variety of careers. In order to prepare learners for these roles, business teachers need comprehensive business preparation and business occupational experience.

2. Characteristics of the Global Marketplace

International business is accomplished through effective communication. Because international trade involves people from different cultures and countries, cross-cultural dimensions of business communication become increasingly important. These dimensions must be addressed to avoid adverse effects on both the communication process and the transaction of business. We believe that awareness and understanding of and sensitivity to the many cross-cultural dimensions of international business communication are crucial to business success in the global economy.

As business expands across national boundaries, understanding of the dynamics and constraints of international trade becomes vitally important. Comparative advantage is the economic principle through which countries attempt to maximize their economic resources and to balance the distribution of natural, human, and monetary resources through trade. We believe that understanding the related economic and social systems of countries and their use of factors of production allows business to function more efficiently in the global economy. Recognizing the increasing interdependence among trading nations and the existing and emerging trading blocs further contributes to efficient business operations within the global economy. Since business functions in a global society, it is imperative that business graduates understand the position of Taiwan in the world economy.

Marketing high-quality goods and/or services does not ensure success in the intensely competitive international marketplace. Even desired goods of services must be marketed in a culturally sensitive manner that fulfills the needs and wants of consumers in other countries. Business firms must operate in a manner acceptable by customers, employees, owners, and governments in countries where they transact business. We believe that the development of international business skills and sensitivity to cultural conditions in

both domestic and foreign markets are essential to long-term success in the global economy.

Of all the resources in the emerging global society, human resources are the most important. To compete internationally, business must have culturally-aware employees who can communicate with persons of their countries. We believe that business employees need to understand other cultures, including social, economic, legal, and political systems. They must become managerially competent and linguistically fluent to function effectively in the international marketplace.

In addition, technological resources are rapidly changing: how goods are designed and manufactured, how services are developed and marketed, and how information is received and processed. Technology is a major factor influencing changes in the workplace, and employees must implement the beneficial aspects of technology to facilitate international business.

Instantaneous transfer of information via satellites enables business to respond rapidly to changes in intensely competitive global markets. We believe that to be successful, international businesspersons must demonstrate high-level communicative, conceptual, analytical, and technological skills.

3. Education for the Global Marketplace

Business educators have primary responsibility to provide the necessary business-related education and training for full participation in the global economy. This responsibility extends to working with other educators planning curricula and implementing relevant learning strategies. We believe that business education must:

1. Promote an international perspective and provide the opportunity for lifelong preparation for active participation in the global economy. Education about globalization should begin in elementary schools and continue on a lifelong basis, with business education making contributions at all stages.
2. Develop an international perspective through curricula that promote understanding of other cultures, languages, geography, social and economic systems, and business practices.

3. Implement and coordinate plans for international education in cooperation with other disciplines.
4. Promote international business courses and infuse international business content into existing business courses at all educational levels.
5. Develop cross-cultural business communication competencies using English and other languages.
6. Develop international business attitudes, skills, and knowledge that reflect sensitivity to diverse cultures. In addition to formal study, strategies for this development could include relevant international cooperative education; internships; and travel, study, and work experiences abroad. These strategies can provide opportunities for effective leadership development and participation in the global marketplace.
7. Promote ethical behavior in the international marketplace through an understanding of the responsibilities of business firms to customers, employees, owners, and governments in the countries in which they transact business.
8. Develop technology-based skills and systems that support and expedite the transaction of international business.
9. Restructure business teacher education programs so practicing and prospective business educators have opportunities to develop the needed international attitudes, skills, and knowledge.
10. Develop international forums for exchanging information about related education and training programs for the global marketplace.

Therefore, we believe that business students must acquire both job-specific skills and broad, transferable attitudes, skills, and knowledge to function in a global marketplace. Further, we believe that these competencies will allow students to benefit from lifelong education and retraining opportunities and to adapt quickly to the changing international business marketplace.

4. Evolving Instructional Contexts for Business Education

We believe that business education programs should develop a broader client base that will become larger and more diverse, beginning with students at the elementary level and continuing throughout life.

Elementary and middle schools will more frequently be sites for instruction in economic education, computer keyboarding, computer applications, and business career exploration. Secondary-level business teachers should be serving a broader learner base by their involvement in innovative programs to serve all students. Customized education for individuals and businesses as well as special populations should become a greater part of post-secondary/collegiate business education.

Lifelong learning will be a requirement for living and working in the 21st century. Therefore, the education, training, and retraining of adults should be a major thrust of education for business. Educational preparation programs should be available not only for teachers in educational institutions but also for facilitators, designers, and developers of programs for training and development in industry.

We believe that greater articulation and integration of instruction for and about business should occur across the total school curriculum with business teachers being full participants in the planning and teaching of programs.

Business teachers should recognize that learners gain similar competencies in different subject areas and levels of the curriculum. Therefore, articulation of instruction throughout the curriculum should become more common. Because greater integration of curriculum enables learners to see the interrelatedness of all knowledge and the multidisciplinary nature of real-world problems, more collaborative learning and team teaching between disciplines should be used in education for and about business.

Because learning is markedly affected by the context in which it occurs, application-focused teaching will become more prominent in the curriculum. Therefore, education for and about business should, through the leadership of business teachers, become more integrated into all instructional areas of the secondary school.

The greater integration of curricula should be viewed as an opportunity to examine teacher preparation as a whole, not just business teacher preparation. As all teachers search for ways to coordinate their teaching, pre-service teacher candidates should consider a double major/minor in business education and another discipline.

A secondary-level education will no longer be sufficient for long-term success in the workforce. Therefore, post-secondary institutions, colleges, and universities should assume a greater role in occupational preparation as a result of an increase at the rate of change in the occupations of the populace.

5. Distinctive Content of Teaching For and About Business

Business Education has two goals, one vocational and one non-vocational. One goal aims at preparing students for entry-level jobs in business, and the other equally important goal is aimed at preparing students to function intelligently in a business society. This philosophy encompasses education about business and education for business (see exhibit 1) The former offers to every individual an opportunity to develop the skills, abilities, and understandings that will enable him or her to cope competently with his or her personal business affairs, to develop and understand of the vocational opportunities available in the broad field of business, such as the Taiwan's enterprise system and its international interrelationships, and to assume citizenship responsibilities and obligations. The latter offers to the students who wish to pursue a career in business an opportunity to develop those skills, abilities, attitudes, and understandings that will enable him or her to enter, perform, and progress in a business occupation after they graduate from business or comprehensive senior high schools or enter two-year or four-year technical colleges. It also provides him or her with the occupational intelligence necessary in our labor force of complex and dynamic economy to fit into and find satisfied jobs.

We believe that business competencies will require not only technical skills but also and understanding of business operations and the social contexts of employment settings that determine how specific skills are applied.

Socio-business/economic education areas such as entrepreneurship, international business, law, management, and marketing are critical to developing comprehensive business understandings. These fields of study should be offered as separate courses and also should be integrated across the total school curriculum.

Technology has increased the ease of calculation and visualization of quantitative relationships through the use of tools such as Excels and

databases. These tools make it easier to encourage depth of understanding and application of quantitative aspects related to personal and business decision-making. Therefore, the quantitative aspects of business problem solving should be prominent in the total school curriculum as well as in courses such as accounting, finance, and math.

Both the teaching of interpersonal and leadership skills to facilitate working in a global economy and the teaching of effective communication and listening skills for use with people throughout the world should be an important part of the business curriculum. Professional student organizations provide a vehicle for developing these skills.

The Taiwan Business Education Association (1995) recommends that at the completion secondary or post-secondary school, students should be able to:

1. Function as economically literate citizens through the development of personal consumer economic skills, a knowledge of social and government responsibility, and an understanding of business operations.
2. Demonstrate interpersonal, teamwork, and leadership skills necessary to function in multicultural business settings.
3. Develop career awareness and related skills to enable them to make viable career choices and become employable in a variety of business careers.
4. Select and apply the tools of technology as they relate to personal and business decision making.
5. Communicate effectively as writers, listeners, and speakers in social and business settings.
6. Use accounting procedures to make decisions about planning, organizing, and allocating resources.
7. Apply the principles of law in personal and business settings.
8. Prepare to become entrepreneurs by drawing from their general understanding of all aspects of business.
9. Understand the interrelationships of different functional areas of business and the impact of one component on another.

10. Develop the ability to participate in business transactions in both the domestic and international arenas.
11. Develop the ability to market the assets each individual has whether they are in the labor market or in the consumer goods market.
12. Manage data from all of the functional areas of business needed to make wise management decisions.
13. Utilize analytical tools needed to understand and make reasoned decisions about economic issues—both personal and societal. (P. 2-3)

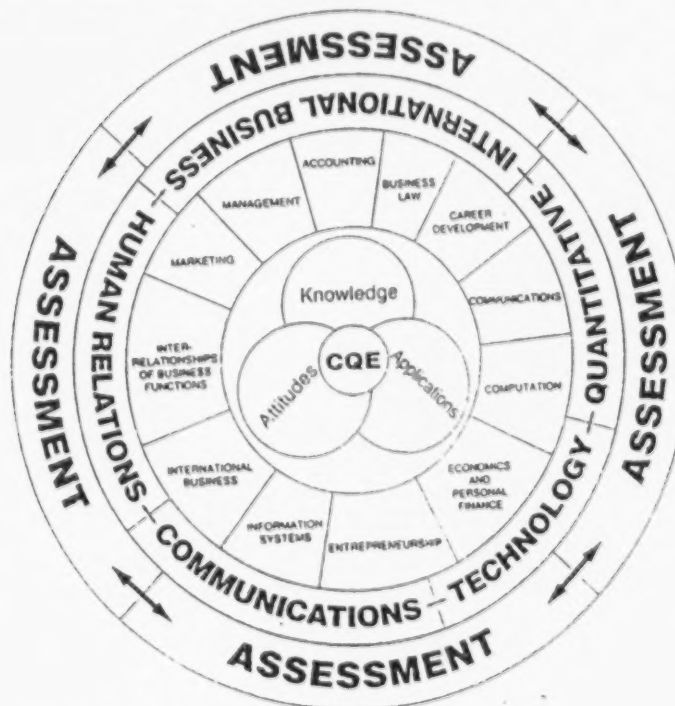
When studying business education, students learn the relationships of one facet of business with another. They understand how the functional areas of business, such as marketing, management, accounting, production, and finance, must work together for a successful business. In addition, they learn the basic skills of computation, communication, decision making, and problem solving. After studying such business processes as markup/markdown, determining the interest on a loan, and figuring the present value of a debt instrument, students readily understand how computational skills are used and why they are important. They also see that jobs are lost, work is not properly completed, and orders are not received because of poor communication. Therefore, the skills of writing, listening, and speaking are important components of all business education courses. The discipline is also replete with problem-solving activities since one of the primary responsibilities of an entrepreneur or business manager is to solve problems that require higher-order thinking skills in analyzing, synthesizing, and evaluating information.

The ability to use computers efficiently with other components of information systems, a basic area of business education, is also a "must" for everyone in our increasingly technological society. One of the most important components of business education is information systems. In this critical area students learn to use computers as tools in conjunction with related software. In addition, they learn to make decisions, to produce professional documents, to communicate via Internet, and to research topics utilizing libraries around the world.

6. Internationalizing Curriculum Standards Model

The nature of work and jobs is changing rapidly. The economy of Taiwan is no longer centered on manufacturing; rather, ours is an information-and service-based economy that the business education curriculum parallels closely. Global competition has impacted the world of work dramatically, causing long-standing traditional jobs to be lost to developing countries. Students who graduate today will enter a job market that is vastly different from just a decade ago. Their employment needs are, consequently, different, and in order to succeed, they must be equipped with new knowledge, skills, and attitudes. The curriculum standards model is designed to prepare students to think, to make decisions, to interact effectively with co-workers, to use creativity to solve problems, and to communicate using all forms of emerging technology. Not only are this model designed to prepare students to work effectively and productively today, it is planned to equip students with the knowledge and skills to adapt to a continuously changing workplace.

The curriculum standards model



Source: Taiwan Business Education Association (1995). P.7.

This curriculum standards model is based on a comprehensive model which includes twelve content areas. These twelve standards areas contain all the subjects that are involved in the discipline of business education. The circular format was selected to indicate the interrelationships of the subject areas to each other, as well as each impacts the others.

Task force members focused this project on a philosophy of continuous quality education. From the inception of the project, plans were made to upgrade these standards on a continuous basis to ensure their credibility. Thus this project, which is founded on the goal of delivering quality education, is designed to reflect the fact that these standards will be continually evaluated in order to provide cutting-edge information for the purpose of curriculum design.

This model requires the comprehension of a wide range of business knowledge, the development of appropriate workplace attitudes, and the application of skills and knowledge to simulated and real-world experiences. Interwoven throughout the standards are five critical overlaying focus areas which should be included in all courses in the business education curriculum: communications, human relations, international business, quantitative, and technology. These five critical areas are shown on the model as surrounding all the curriculum areas, indicating their importance in the comprehensive development of students of business.

The outer dimension of the model is devoted to assessment, which is considered essential to the philosophy of continuous quality education. This model encourages and endorses the need for frequent assessment with the idea of improving the content of the business education discipline while ensuring that Taiwan's students are being provided the finest education possible.

7. Conclusion

In a global society that is teeming with new business applications and practices, a world that is exploding with emerging technology, it is imperative that all students learn the basics of business. The knowledge and skills that students can develop by accomplishing this model can provide the tools for their personal and professional success. As the nature of jobs and work continues to change, the importance of

business education for all students increases. Young people must be taught to thrive in an increasingly difficult setting and be capable of establishing a satisfactory standard of living. All students should know how business operates and how they affect and are affected by societal, governmental, and economic phenomena.

Reference:

Chen, Kuang-Ku (1998). The principles of technical and vocational business education, third ed., Taiwan, Changhua: Fu Wen Books Co.

Daughtrey, A. S. & Ristau, R. A. (1991). Basic business and economic education: Learning and instruction, fourth ed., Cincinnati, Ohio: South-Western Publishing Co.

National Business Education Association (1995). National standards for business education: What America's students should know and be able to do in business, Reston, VA: NBEA Publication Sales.

[Summary of the Discussion]

Meng Guangping: Many features of business education are shared by the whole vocational education. The report is of universal significance.

Wagner: What can we do to conduct business education in the enterprises, in order to prepare the trainee more efficiently for latter job performance? During my work here in Shanghai, there is a phenomena which I encounter frequently: Many Chinese students are good at computer and theoretical subjects, but they cannot cope with the most fundamental problems when they step into the enterprises. How can we solve this problem?

Kuang Ku Chen: Generally speaking, it's impossible for a manufactory to set up a vocational education institution. An enterprise above the medium size may establish a training department. Those small sized enterprises may get their employees outside the enterprise (from other enterprises, schools, or other countries). If students cannot apply what they have learned in school when they first step into the society, the reason is usually that the subjects in school are too theoretical. The success of vocational education depends on two

important conditions: first, business and education must cooperate with each other; second, the credential system must be strengthened.

Cheng Yonglin: Now Taiwan has abolished the three-year junior colleges that take in general high school graduates. On the contrary, the higher educational institutes in the mainland are taking in a large number of general high school graduates. Is there any divarication on this issue in Taiwan? Can we conduct business higher education in the three-year junior colleges?

Kuang Ku Chen: Technical colleges are products of the industrial economy. When it enters the 21st century, only the two-year technical colleges may survive. Originally, Taiwan got more than 70 junior colleges. Now more than 10 of them have been changed into universities of technology. And the number of the junior colleges will be reduced to 30-40. The three-year junior colleges have been called off not because there was some fixed administrative order but because the high schools graduates didn't enroll in these colleges that would not issue any degrees.

Fu Hung Yuan: I have one point to add: the senior high school (secondary vocational education) graduates must take an extra examination on technology (the examination time is longer than usual) to enter the junior colleges. The universities of technology are divided into two-year and four-year universities. It's impossible for the general high school graduates to beat the graduates of two-year university of technology.

Special Report

Prof. Liu Chunsheng

(Tianjin University)

(translated from Chinese into English by Zhang Qiang)

A Brief Survey of Knowledge Economy and Vocational-Technical Education

Ever since the American scholar Fritz Machlup brought forward the concept of *Knowledge Industry* in the '60s¹, great concern has been shown about Knowledge Economy, starting an upsurge of studying this subject. As a matter of fact, vocational educators in China have also begun to study the impact of technical and vocational education (hereafter TVE) upon Knowledge Economy. However, different views remain on some issues. Will Knowledge Economy encourage "credentialism" or pursuit for higher education diploma? Will the secondary TVE still need to be developed in the Knowledge Economy? How should TVE adapt to Knowledge Economy? This paper is to state my personal opinion on these issues.

1. The Connotation and Significance of Knowledge Economy

Knowledge Economy is a new type of economy emerging in human history after the agricultural economy and the industrial economy. Developed on the basis of industrialization, Knowledge Economy is generally accepted as the economy of the post-industrialized society. It is established on the basis of the production, memory, application and consumption of knowledge, with modern science constituting its core.²

It was Harvard professor Daniel Bell who first brought forward the concept of post-industrialized society in the 70s. Bell suggested that "1945-1950 could be regarded as the period that witnessed the naissence of the post-industrialized society. During this period, the United States has become the first nation in history in which more than half of its employees are no longer engaged in the production of

¹ Chen Xuefei (chief ed.): *A Survey of Current Trends of Higher Education in USA, Germany, France and Japan*, Shanghai, Shanghai Education Publishing House, 1998.

² The 1996 Annual Report of OECD: *The Economy Based on Knowledge*.

tangible end products such as foodstuff and houses...knowledge workers are obtaining the dominant position".³ Alvin Toffler, a famous American futurologist, named it as super-industrialized society rather than post-industrialized society. In *The Third Wave* (1980), he divided the human civilization into three phases, namely, the agricultural age, the industrialized age, and the super-industrialized age. Currently human beings are confronted with the lash of The Third Wave—the shock brought by the super-industrialized society. Toffler believes that the technological foundation of the third wave society is constituted by the new and expanding industries developed on the comprehensive scientific theories of quantum electronics, information science, molecular biology, oceanics, nucleonics, ecology and spatiography. He even advocated in his book *The Power Shifting* that "Knowledge is taking the superior position that used to be dominated by money and becoming the symbol of power. Those who own a great variety of knowledge will be masters of the coming century." In 1982, futurologist John Nisbitt pointed out in his book *The Great Tendency* that while capital was the strategic resource in the industrial society; information will be the strategic resource in the information society. The value accumulation in the information society is not realized through labor but through knowledge. A famous American business managerialist once said, "Knowledge productivity is critical to production force, competitiveness, and economy. Knowledge Industry has become the primary industry. It provides the economy with necessary and important production resources."

It has been proved that the Knowledge Industry is developed far more rapidly than other industries. In the United States, for example, the 36 knowledge industrial sectors achieved an annual growth rate of 10.6% during the 11 years from 1947-1958. At the same time, the growth rate of the GNP was 5.9% and that of the industry was only 4.1%. Statistics of the Organization of Economic Cooperation and Development (OECD) show that the Knowledge Economy of its chief member states has covered more than 50% of the GDP. The Microsoft Company of the United States founded by the computer giant Bill Gates, the most qualified representative of the Knowledge Economy, has accumulated an asset of over US\$ 36 billion. Meanwhile, its marketable value has amounted to more than US\$ 150 billion within 23 years of its history. It again proves the correctness of the celebrated diction "knowledge is power".

³ *Future and Development*, 1982, Vol. 3.

As Knowledge Economy is "blowing on her face", China has also attached great importance to it. When meeting the academicians from both the National Academy of Science and the National Academy of Engineering in June 1, 1998, President Jiang Zeming pointed out, "In the current world, the science and technology mainly represented by information technology are improving with each passing day. The transference from high-tech results to mass production is getting more and more rapid. The Knowledge Economy that has just given some inkling shows that great change will take place in the economic and social life of human beings...Facing such a situation, we must conform to the historical trends and seize the hour." "This is vital to the realization of the grand objectives of our cross-century development and the great revival of Chinese people."

2. Knowledge Economy Calls for Highly-Developed TVE

Speaking of Knowledge Economy, we will inevitably face a very theoretical and experimental problem: will Knowledge Economy still be in need of TVE? Some researchers believe that "we need to popularize the primary compulsory education to initiate the economic take-off, reinforce the secondary TVE through the industrial modernization, and focus on the higher education in the age of Knowledge Economy when it experiences the industrial transformation and all the manufactured products will finally enter the international market"⁴. Regarding the current setback met by the secondary TVE and "pursuit for general high schools" as "an inevitable trend during the period of transformation", some researchers even advocate that we should turn vocational high schools back into general high schools. Then, is Knowledge Economy no longer in favor of TVE? The answer is definitely negative.

Knowledge Economy Society will increasingly rely on information and science and technology. It may also be regarded as a society of intellectualization and learning. Education will be the prime means of creating and disseminating knowledge. "Exactly like that industrial society depends on the constant consumption of capital and the reproduction of the skillful management and workers, the knowledge-based society counts on the progress of knowledge and the

⁴ *China Education Daily*, P. 4, "Inevitability in Developing Higher Education", Aug 10, 1998.

reproduction of intellectuals.”⁵ Therefore, we can say without exaggeration that education is the heart of Knowledge Economy and schools are the foundation of the development of the Knowledge Economy Society.

In the Knowledge Economy Society, it is generally accepted that the higher education, which holds the responsibility for cultivating advanced professional specialists, should act as the vanguard and the file leader. As pointed out by American professor Harold Perking, in the post-industrial society, universities will become “the axis institutions” not only because they will have to cultivate intellectual elites, but also in that they should provide knowledge for the whole society. Thus it is quite natural and necessary to draw a conclusion that “we need to develop higher education” in Knowledge Economy. However, it is rather debatable that we may not continue to make great efforts to develop TVE.

As we know, social set-ups are multivariant, social divisions of labor are diversified and their demands of cultural level and technological structure for professionals in different fields are also multifarious. Even in the United States where Knowledge Economy has been well-developed (The employees engaged in the Knowledge Industry made up 53.1% of the total American workforce as early as in 1970)⁶, those who are engaged in the research and development of knowledge products are just the minority, while the majority still have to work in the manufacture, management, sales and service sectors. Obviously, the culture of this huge team of applied-type intellectuals and skilled workers remains dependent to a great extent on the vocational education. The rapid development of the vocational education in the United States after World War II when it entered the Knowledge Economy Society, especially the boost of the 2-year community colleges spoke for this point. During 1950-1970, American undergraduates increased by only 150%, yet the community college students increased by 900%. In the academic year from 1958-1959, community college students made up only 11.9% of the total college students. 10 years later, the proportion increased to 18.6%. In the academic year from 1978-1979, it increased to 21.5%. It can be said without exaggeration that the Knowledge Economy of the United

⁵ Wang Chengxu (chief ed.), *A New Survey on Higher Education*, Zhejiang Education Publishing House, 1998.

⁶ *Ibid*, P. 42.

States could not have made today's achievements without the support of the TVE. What's more, apart from the Knowledge Industry, 49.9% of the total American workforce are still engaged in the traditional industries and other industrial sectors. Among them, most are operators and businessmen working on the front line of manufacture and management sectors. The employment preparation and in-service education for these personnel will inevitably depend on vocational education.

In China, Knowledge Economy has just shown its inkling. Knowledge Industry holds only a limited share in GNP, and scientific and technological level is rather low. Statistics show that in early '90s the automatic and semi-automatic assembly lines made up only 2.5% of the original value in the state-owned enterprises, and a minimum of 65% of the major production facilities are of the average and even lower domestic levels. 40% of the workers in the industrial enterprises above county level are engaged in manual operation. A survey made by World Bank in 1985 shows that 20% of China's industrial units reach the level of 60s or 70s, 25-30% are outmoded but still of some use, and as high as 55-60% should have been eliminated⁷. Therefore, there is quite a big gap between the development of Knowledge Economy in China and that in the developed countries. China's industrial structure stays at the stage of "one-two-three", left far behind the "three-two-one" structure of Knowledge Economy Society, and a long distance away from the "two-one-three" stage of industrialized society. The present situation of our country requires us to take cautious measures to develop education. Thus it is still a wise strategic choice to develop China's educational structure in accordance with the principle of "giving a high value to the popularization of the 9-year compulsory education, making great efforts to develop the TVE, and steadily developing the higher education". Through the long process of industrialization of China, TVE will play a very important part, which cannot be replaced by any other education till the second half of the 21st century when China has realized the modernization and steps forward to Knowledge Economy Society. Therefore, any practice of blindly pursuing high diplomas after the developed countries or stressing higher education and ignoring secondary education without paying attention to China's national situation, any proposition that we may ignore or even abolish TVE, especially the secondary vocational education, is irresponsible and harmful. It is true that many factors

⁷ *Guangming Daily*, Feb 2, 1991.

including the family, the society, the employing unit and the school have given rise to the current "pursuit for general high schools" and the decrease in vocational school enrollment, but some excessively premature concepts, theories and propositions cannot shirk their responsibility. As a matter of fact, it is a wrong impression that Knowledge Economy means every one should obtain a university diploma. The laborers working in the front line always make up the majority of the work force at any time and in any society. To offer these hundreds of millions people opportunities to receive vocational education at different levels and culture them into skillful workers, farmers and other kinds of laborers is far more practical and practicable than expel all of them to obtain a university diploma.

3. The Demands Created by Knowledge Economy for TVE

Although Knowledge Economy has just gained ground in China, it will inevitably exert great influences upon the economic structure, the industrial structure, the employment structure and all the other fields of the society. As a result, it will raise new requirements for TVE, which is responsible for the culture of reserve labor force. We do oppose any "excessively premature" practice in TVE as it should be oriented toward "today's existing posts", but we should also take into consideration of "tomorrow's professional demands" and adapt actively rather than passively to the situation so as to promote the development of the economy and the society.

3.1 See to set sound foundation

The foundation consists of both the cultural foundation and the professional foundation, including necessary cultural knowledge, sufficient basic professional theory and essential practical abilities. Cultural knowledge is the foundation to ensure the professional study and the premise of improving the quality of manpower in the future. Thus great importance should be attached to it. To guarantee that the students will master "necessary" cultural knowledge, unified examinations for major cultural courses equivalent to the basic general high school level have been carried out in some vocational high schools. This is absolutely necessary. We cannot run vocational schools without any rules or standards, and cannot open or eliminate cultural courses randomly as we did a few years ago. We should not allow students to leave school and enter the job market before they complete

their study to meet the temporary needs of the employers. To do so is equal to "cooking the radish before washing away the mud on its surface", because these "semi-finished products" will finally join the unemployment and bring forward unfavorable influences on the improvement of the manpower and the realization of the career transference. Vocational educators cannot be shortsighted and should not sacrifice the long-range interests to gain the current benefits. We must pay attention to the culture of the students' comprehensive quality so as to guarantee the prospective laborers' quality.

Professional basic theory and practical abilities are the foundation and premise of formulation professional capability. They are also vital to the stamina of the students in their future careers. Students who have laid solid professional foundation "may not be able to become specialists right away but they are so adaptable that they can easily transfer from one job or career to another. Besides, they have acquired a wide range of knowledge and thus laid a solid foundation for further study"⁸. When carrying out the culture of professional foundation and basic skills, we must choose the contents the most basic, most important, most useful and most practical professional knowledge, theory and skills. The range of the selection should not be too broad or too narrow.

3.2 See to widen the specialties

Vocational education is professional education. The nature and the tasks of vocational education demand that clear-cut professional features and basic professional quality should be maintained to meet the needs of employment. Yet China's vocational education has long been influenced by the planned economy. As a result, it only emphasizes the culture of "specialists" for certain professions and even certain branches of work. It cannot adapt to the market economy.

As pointed out by Wen Shilie, an academician of Chinese Academy of Engineering, the whole world is closely integrated. It is only because of man's limited cognitive ability that the world is classified into certain subjects and this classification has become more and more delicate. With the progress of science and technology, however, the practice of classification will gradually be replaced by the trend of

⁸ Fu Juanming etc ed., *A Comparative Study of Higher Education*, Atomic Energy Publishing House, 1990.

integration, revealing the principle of "classification leading to profundity; while profundity leading to comprehension; and comprehension in turn leading back to integration". In the Knowledge Economy Society, workers involved in the process of modern production may operate the machines without facing them directly, and the production will be conducted automatically, intellectually and remotely by means of all the possible technological devices. It thus increases to a great extent the technological intensity of the production process and the new products. Facing the tendency toward scientific and technological integration, the intellectualization of production devices, the radical change in industrial structure and the bitter selection of job market, formal vocational and technical schools must attach great importance to the widening of specialties so as to put out "all-purpose" or "multi-functional" intellectuals. Just like what has been pointed out in the *Proposals for Technical and Vocational Education* promulgated by the 18th Conference of the UNESCO, "The technical and vocational education that is aimed at employment preparation should lay a foundation for effective and satisfactory works. Therefore, it should, first, enable the trainee to acquire a wide range of knowledge and necessary basic skills needed in a certain profession or for several jobs, so that he will not be held back by his education in selecting his career or transferring from one career to another in his life; and second, get the trainee fully prepared in profession for his first job and provide him with effective in-service training; and third, help the trainee to acquire ability, knowledge and attitude needed for further study at any stage of his professional career." Thus it is universally accepted that the traditional "specialized" intellectuals be replaced by the "all-purpose" intellectuals.

3.3 See to cultivate comprehensive vocational abilities.

Vocational abilities are essential to vocational activities. They are the externalization and reflection of the laborer's knowledge, skills and quality. Comprehensive vocational abilities consist of 1) the professional abilities such as the technological operation ability, the technological management ability and the technological diagnosis and maintenance ability; 2) the general abilities such as the cognitive ability, the expressive ability, the social ability and the survival ability; and 3) the key abilities such as the respect for work, the cooperation ability,

⁹ *A Collection of Reports on the 21st Century Oriented Higher Education Reform and Development*, P. 11, Higher Education Publishing House, 1997.

the willpower and the healthy mentality.

The "ability-centered" vocational teaching methodology that began in the North America in 70s merely focus on the culture of professional abilities, stressing too much the social adaptability of vocational education. It reveals the eagerness of the vocational educators for quick success and instant benefits, and it is rather pragmatic. The comprehensive vocational ability education not only inherits the social adaptability of the "ability-centered" education, but also lays emphasis on the all-round development of humanity that has been neglected. It reflects the demand of Knowledge Economy Society for one's overall quality.

An important guiding principle of the comprehensive vocational ability education is to change the target of vocational education from pure "technological laborer" into "technological humanist". Knowledge Economy Society will be a society with highly civilized humanity and highly developed science and technology. The whole society will show a tendency of rational development. In the current oil civilization, the relationship between man and nature is characterized by "plunder and conquer". The production with high energy consumption, high resource consumption and high pollution has led to many problems such as soil degradation, water pollution, vegetation destruction, species extinction, and rapid resources reduction. In Knowledge Economy Society, in contrast, people will keep a rational relationship between man and nature as well as man and society. People will act according to the principle of harmony and build up an "ecological civilization" to replace the "oil civilization". It then requires the prospective laborer should be responsible for the whole humanity. He must possess relatively high humanist and scientific quality and the comprehensive ability to interpret a technological problem by placing it in the whole social system and analyze it from the angle of politics, economy, laws, ecology and even ethics.

Among the comprehensive vocational abilities, special importance should be attached to the following two abilities: the surviving ability and the pioneering ability. The importance of the surviving ability can be seen from the fact that the 21st Century Committee of UNESCO has listed "learning to survive" among the "four pillars" of the education in the coming century¹⁰. As we know, one of the basic characteristics of

¹⁰ *Education—with Wealth in it*, Education and Science Publishing House, 1996.

the market economy is the competitiveness. "Survival of the fittest" is both the principle and the result of the competition. Knowledge Economy Society is one filled with competitions, so we will have to learn to survive in these competitions. The surviving ability not only creates demands for the mastery of surviving knowledge, technology and skills, but also calls for excellent mentality and strong willpower to meet various challenges in the fierce competitions. The basic character of Knowledge Economy is the ever innovation of knowledge. "Innovation is the soul of a people's progress and the never exhausting power of a nation's prosperity"¹¹. In the vocational education, the innovative ability is represented by the pioneering ability. Pioneering is not equal to innovation, but it reveals the spirit of innovation. We lay emphasis on the culture of the pioneering ability not only because the change of the industrial structure and the employment structure in the Knowledge Economy Society has accelerated but also because the labor force in our country is in excess of demand. If the intellectuals we cultivate have mastered the pioneering ability and skills, they will continuously create new careers for themselves. This will certainly reduce the employment pressure and promote the economic development and social progress.

In short, Knowledge Economy has displayed a brighter future for technical and vocational education, and the vocational education in China will help realize the Knowledge Economy as soon as possible.

[Summary of the Discussion]

Qian Jingfang: The proposition that "Knowledge Economy no longer needs vocational education" is too ignorant to be taken into consideration. I suggest that we should focus our discussion on "how to adapt vocational education to Knowledge Economy". The examples concerned American community colleges actually prove that the focus of the vocational education is now shifting to a higher level.

Liu Chunsheng: The answer to "whether we still need to develop vocational education" is definite. The main divarication lies in "whether we still need to develop secondary vocational education".

¹¹ Jiang Zemin: "Speech to the Academicians from the CAS and CAE", *Guangming Daily*, Aug 10, 1998.

As the technological level in our country remains low, we should continue to develop and strengthen the secondary vocational education.

Xu Wenlong: Knowledge Economy brings about three kinds of influences to vocational education. First, the education level has to be raised. Second, it changes much faster. Third, one will change his career frequently during his life. The situation requires us to "learn to survive". The proposition put forward by the report that "China will enter the Knowledge Economy Society in the second half of next century" is debatable. The standard of Knowledge Economy is that the contribution rate of knowledge to the economy must amount to 80% (now OECD has reached 50%). Personally, I believe that China will enter the Knowledge Economy Society in 2050s, otherwise it will be dropped out.

Liu Chunsheng: I raised the proposition in the report according to the program of "developing in three stages". According to the program, the GNP will reach US\$ 6 trillion in 2050, or US\$ 4,000 per capita (the estimated population will reach 1.5 billion). It's equal to the level in 1985 in South Korea. Some advanced areas will be able to enter Knowledge Economy in 2050s. But so far as the whole country is concerned, I'm afraid it will be some time later than that.

Special Report

Prof. Cheng Yonglin

(Shanghai Institute of Vocational and Technical Education)

(translated from Chinese into English by Zhang Qiang)

The Organization, Focus of Vocational Education Study and Its Impact on the Development of Vocational Education - A Survey also on the Status, Characters, Functions and Significance of Shanghai Institute of Vocational and Technical Education

A comprehensive observation of human history shows that man's scientific thinking has exerted great influences on the progress of civilization. Theoretical study provides guidance for practice and help curb blindness in action, making the human society more self-conscious in its interaction with the nature. The development of the natural science leads to the progress of technology, and that of the social science advances the progress of human civilization. Concretely speaking, the development of vocational education study also plays an active role in promoting and advancing the progress of vocational education practice, as can be fully illustrated through the analysis of the organization and focus of vocational education.

1. The Status and Characters of Vocational Education Study

The vocational education in modern China carried out in form of school originated from the end of Qing Dynasty. It now has a history of more than 100 years. The year 1917 witnessed the establishment of China Vocational Education Society, which made great efforts to promote vocational education and at the same time conducted active theoretical study of vocational education. It marks the beginning of the vocational education study in China.

After its founding, New China introduced systematically from the Soviet Union the models, subjects and textbooks of the specialized secondary schools and the technical schools. In the '50s and '60s, quite

a few papers and monographs were published. The research results then (for example, those on the work-study program and rural vocational education) carried forward to a certain extent the vocational practice.

After the Third Plenum of the 11th CPC Central Committee held in 1978, China began to proceed with a reform on the secondary education structure. As a result, the vocational education has developed rapidly since then. Though the corresponding research falls slightly behind the development of the entire vocational education cause, its overall achievements are satisfactory. During the past ten years, in particular, vocational education research institutions of all types and levels have been established. Among them, only a few are research organizations of the state level, and most are attached to different trades and professions (ministries or committees), regions (provinces or municipalities), higher education institutions or vocational schools (Details see Appendix 1). These non-state research institutions consist of the vocational education research centers of all professions, vocational education study societies or associations, the vocational education research offices of the prefecture educational commissions, and the vocational education research offices of the normal universities and technical colleges, etc. All the research institutions have clear-cut divisions of work, each holds its own responsibilities, bearing more and more research results and issuing more and more research publications (Details see Appendix 2). So far as the overall situation is concerned, the general functions of the vocational education research institutions are as follows:

- to study the vocational education development strategies;
- to make policies and spread experiences;
- to organize the making of the teaching program and plans;
- to explore and train teacher resources;
- to provide information consultancy and service;
- to organize teaching and researching activities and professional competitions;
- to edit and issue public or internal publications.

Since 1980, the vocational education research work has been brought into the state educational science research program as an independent item. An independent vocational education study team has been set up under the leading group of the national educational science program. Affluent results have been achieved in the theoretical study,

curriculum construction and important experiments of vocational education, providing certain foundation for the policy-making by the government and the education administrative departments.

Take Shanghai for example, this municipality gains its technological and intellectual advantages to a great extent through the development of the vocational education. Shanghai was opened to the outside world in 1850s. The establishment of the Machine School of Jiangnan Manufactory marked the beginning of China's vocational education. After continuous development for more than 100 years, Shanghai's vocational education has formed its sharp-cut feature of high adaptability and flexibility, cultivating technical intellectuals with relatively high qualities and skills one generation after another.

After 1978, with the increasing need of the modernization construction and the deepening of the education restructuring, Shanghai's vocational education has stepped into a new stage of development. Its vocational education research has also taken a leading role in the whole nation. Generally speaking, there are not many specialized vocational education research institutions in Shanghai, but the highly professional research staff can carry out the vocational education research tasks effectively. These institutions mainly include:

- Scientific organizations attached to higher education institutions, which carry out the research work of the basic vocational education theory and its application by taking the academic advantages of the universities;
- Teaching and research organizations attached to the governmental administrative departments, which carry out the teaching and research work concerned with all the vocational schools and relevant training institutions. Meanwhile, they hold some administrative responsibilities;
- Socialized professional research organizations, which mainly organize and coordinate societal and professional forces to conduct teaching and research work about practical issues.

As these research institutions are governed by different controlling bodies, and their own scope and function of research are also limited, it is obvious that they cannot perform well at the same time the task of providing consultancy for the decision-making and that of offering guidance to the practice. The establishment of Shanghai Institute of Vocational and Technical Education (RIBB) brought into Shanghai a specialized and comprehensive application research organization,

marking a new stage of Shanghai's vocational education research.

Shanghai Institute of Vocational and Technical Education is a vocational education organization governed by Shanghai Educational Commission under the unified guidance and coordination of the Vocational Education Research Center of the State Educational Commission. In 1991, it obtained the support of the German Federal Ministry of Economic Cooperation Development and became a Sino-German Cooperation project. In 1995, it further joined Shanghai Academy of Education. To make it clear, there are three vocational education institutes as Sino-German projects throughout the country, i.e. the vocational education research center under the Educational Ministry in Beijing and two regional institutes respectively in Shanghai and Liaoning. The three institutes cooperate with each other and conduct research and study on the common problems in China from both the macro and the micro viewpoint. Their research results (for example, the pilot experiments after the teaching model of German "Dual System") have exerted great influences on China's vocational education study and practice.

In China, the social and economic development levels in different regions are uneven, with Shanghai taking the leading role. It requires that Shanghai's vocational education research organizations and their functions should be of high level and take on the responsibility as a sample. As a regional institute, Shanghai Institute of Vocational and Technical Education is mainly aimed at the comprehensive applied research about the vocational education reality in Shanghai, i.e. the local application of the basic principles of vocational education. The tasks are as follows:

- To provide information and consultancy for the departments in charge of the policy-making and practice of vocational education;
- To shoulder the responsibilities of vocational education research and exploitation assigned by Shanghai Educational Commission and the State Educational Commission;
- To organize the academic exchange and research on vocational education in Shanghai and South China;
- To cooperate with the Central Institute of Vocational and Technical Education under the State Educational Commission in designing and experimenting with vocational education development programs; and carry them out in Shanghai and South China in accordance with reality;

- To conduct the research on the basic theory and its application of the primary vocational education, preparation education and further education;
- To carry out all types of vocational teaching experiments, including the pilot experiments after the German "Dual System";
- To formulate rules and regulations as well as training programs for vocational teachers and administrator resources;
- To provide consultancy on vocational education reform for the trades and enterprises concerned as well as all the vocational and technical schools.

Shanghai Institute of Vocational and Technical Education now has five research offices, shouldering respectively the research work on the vocational education development program and policies; the vocational teaching process and pilot experiments; the culture of vocational teachers and staff; the career instruction and employment consultancy; and the professional criterion, testing and credential issuing. In addition, there is an information reference room, an administrative office, a training department, a newsroom, a consultancy service company, a technological development company (Shuangyuan), and a vocational information center (Kangpei) in cooperation with the institute. The institute has set up an administrative committee and an academic committee, working together with a long-standing German expert team. A scientific research team formed by professional and part-time personnel, together with the advanced technological equipment supported by the German technological cooperation company guarantee the smooth development of the scientific research work.

In recent years, Shanghai Institute of Vocational and Technical Education has taken on and accomplished successively dozens of research tasks of the country level, ministerial level, provincial level and institutional level as well as some international cooperation projects. Affluent and effective results have been achieved. The scientific research personnel have been improving their own academic level and professional abilities in the research work. Approximately 200 papers written by the scientific research personnel have been published since the establishment of the institute. Among them, many have been awarded or reprinted or quoted. The ten plus monographs and collections of papers edited and published by the institute have also been widely accepted. The magazine formerly compiled and issued by the institute, *Shanghai Vocational Education*, has been twice awarded

as one of the national excellent publications on vocational education. The institute is in charge of working out *The Annual Report of Vocational Education in Shanghai* to provide statistics and information data. It has provided Shanghai Municipal Government, Shanghai Educational Commission, and the educational administrative departments of all levels with many research and investigation reports and policy-making programs, many of which have been adopted and carried out. It has also helped relevant enterprises and vocational schools to formulate training programs and curriculums, and provided them with teacher and administrator training, career instruction, and consultancy service. The Vocational Education Station of Shanghai Science and Education Network that is under construction in the institute will create favorable conditions for all the vocational institutions in Shanghai to realize the "informationalization" of the vocational education administration and to connect with the Internet. In addition, the institute has sent quite a few professional personnel to Germany and Singapore for further study or investigation, which will play an active part in promoting China's vocational education reform by sharing advanced international experiences.

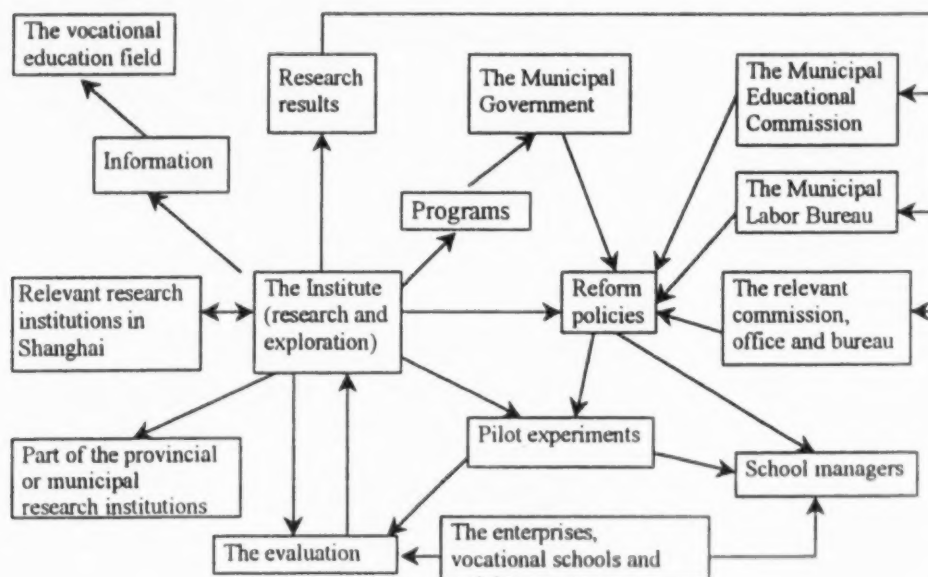
The analysis above and the appendices show that the research work and the corresponding activities carried out by Shanghai Institute of Vocational and Technical Education have exerted certain influences on Shanghai and even the whole country, contributing actively to the development of vocational education in China, especially in Shanghai. From now on, Shanghai Institute of Vocational and Technical Education will continue to strengthen its relations and cooperation with all circles of life, including enterprises, schools, and domestic and overseas institutions and academic groups that are concerned. It will work all-out to serve the vocational education cause in Shanghai and even in the whole China.

2. The Principal Functions of Vocational Education Research

The relationship between theory and practice has always been the fundamental question of philosophy. How does scientific research influence practice? The answer is by means of its functions. The concrete expressions of the functions of scientific research in different fields at different times and in different regions are also different. Now that the Knowledge Economy has already shown its inkling, science, technology, information and education have become more closely

related to the economic development. The conversion from science to technology and from technology to products is increasingly fast. The universities are no longer ivory towers but partners of the industries. Under the new historical condition, researches, especially applied researches should not lose contact with the practical needs and simply proceed with the pure theoretical study. Apart from exploring the regular laws and increasing human knowledge, the functions of the scientific researches should also include looking into the ways of transferring knowledge into products. That is to say, the scientific research should not only explore the laws of the nature and society, but also offer as its function consultancy, development, popularization and service so as to materialize faithfully its role in promoting practice. The vocational education research also conforms to this rule. The functions performed by Shanghai Institute of Vocational and Technical Education in an all-round manner effectively speak for it.

Since its establishment, Shanghai Institute of Vocational and Technical Education has been engaged in the research on applying the vocational education principles to the vocational education practice, and successfully performed its tasks of providing the government with references for policy-making and helping the vocational schools solving realistic problems. Generally speaking, its principal functions are embodied in the following five aspects: research, development, popularization, consultancy and service, whose relationship is displayed in the following chart:



Here is a brief explanation of these functions:

- Research:

It is quite natural that the institute should take research as one of its functions. When it was founded, the institute set down its primary task as "applying the basic theories to practice". It has proved that this task helps carry out the function of the research in the practice. We have never denied the importance of theoretical research, as we know that applied research cannot be done without theoretical study. However, if we say that the theoretical study is a "water storage basin", then the applied research must be the "water pump" that lifts water from basin and spreads it into garden. Too often our problem is that the soil has been dried up while the basin is still full of water. The reason is that we lack of such "water pumps". Therefore, it is rather important for Shanghai Institute of Vocational and Technical Education to take the applied research as its primary task.

- Development

Undoubtedly the research work is the center and the gravity for an institute, but the research effects should be radiated to every respect. It thus creates a new demand for us to apply the research results to the practice. The process of result application will help discover new research requirements and explore new research projects. From the very beginning, Shanghai Institute of Vocational and Technical Education has integrated the researches and the result application in its work by making great efforts to apply its research results all the time. For example, it has drawn up the development programs for many trades and regions and helped schools and enterprises to work out the curriculums and the teaching aids. The newly established Shuangyuan Technology Development Company attempts to accomplish its work in this field.

- Popularization

If a research result or some advanced experience is limited to application and not popularized, then its influence will also be limited. As a high-grade research organization with high research expectations, a comprehensive institute must never shift its responsibilities and duties to popularize the research results. After cooperating with the German experts for years, we have fully realized that the German "Dual System" is an effective and advanced vocational education model, so we have tried all out to carry out its pilot experiment in China. So far we have set up nearly 20 pilot schools that conduct

vocational education by using essential elements of the "Dual System". In addition, the popularization of the reform experiments on vocational education curriculum, modern education technology, student-oriented learning and teaching methods, and comprehensive high schools is also under way.

- Consultancy

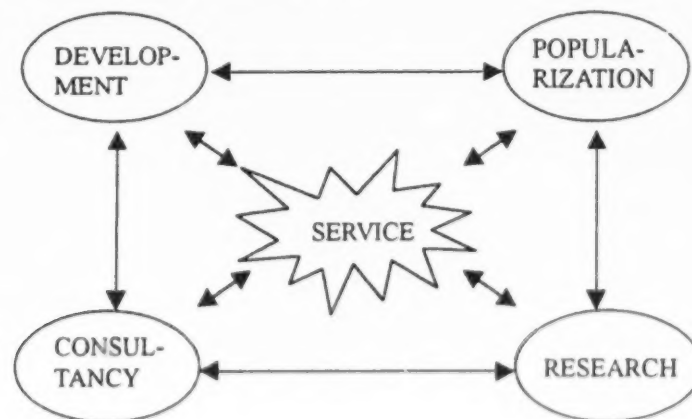
One way to convert the research results is to get them applied by the educational policy-making departments or actual education staff. Right now the vocational education research institutions have no definite vertical or lateral relations with each other, so Shanghai Institute of Vocational and Technical Education has paid particular attention to the contact with educational science research institutions by jointly studying common problems. Therefore it has always kept up with the latest trends and provided timely policy-making consultancy for Shanghai Municipal Government, the Municipal Educational Commission, the Municipal Labor Bureau and the educational administrative departments of other trades and professions. This helps optimize the policy-making for Shanghai's vocational education and reduce the mistakes in practice. A series of overall programs and concrete measures of vocational education development have been issued by Shanghai Municipal Educational Commission. Most of them are products of the effective consultancy provided by Shanghai Institute of Vocational and Technical Education.

- Service

The value of the research results is embodied in its social and economic effects. This is another realistic problem that is faced by China's vocational education research institutions at the present stage. Therefore, in recent years, Shanghai Institute of Vocational and Technical Education has laid special emphasis on meeting all kinds of realistic needs emerged in the process of vocational education development. For example, in order to adapt to the rapid growth of Shanghai's labor market and provide the broad masses of students and citizens with the integrated, complete, and accurate information, the institute has co-established Kangpei Job Information Center on the basis of the original career instruction office and achieved remarkable social and economic effects. The institute will also set up the Vocational Education Station of Shanghai Science and Education Network to create favorable conditions for all the vocational institutions in Shanghai to realize the "informationalization" of the vocational education administration and get them ready to connect with

the Internet. Besides, as the cadre training base for Shanghai's vocational schools, the training department of the institute has held successively 7 terms of post training class for headmasters and 3 terms respectively for chiefs in charge of teaching affairs and general affairs.

The relations between and among the five major functions are demonstrated in the following graph:



3. The Impact of the Vocational Education Research upon the Vocational Education Practice

The concrete influences of the vocational education research on the vocational education practices are mainly reflected in that the educational research has contributed a lot to all the major educational reform policies since 1976. They are also embodied in the enrichment of vocational education practice brought about by the pilot experiments and the change of people's traditional thoughts through the popularization of the vocational research and theories.

The Decision of the CPC Central Committee on the Educational Restructuring published in 1985 set it down as an important strategy that "we should endeavor to make great progress in vocational education" and "gradually set up a vocational education system that ranges from primary level to high level with supporting professions and a reasonable structure".

In 1976, the Cultural Revolution came to an end, but everything was to be taken up in all walks of life. Having long followed the example of

former USSR's teaching models, our education was not quite fit for the reality. But it was not clear whether we could carry out the vocational education in a large scale. In order to help make a correct decision, the vocational researchers conducted active exploration in this field. As we had not carried out sufficient vocational researches and practice, the theoretical research during that period mainly concentrated on the introduction, interpretation, analysis and dissemination of the foreign experiences. From late '70s to mid- '80s, comparative vocational education study was the focus of the research activities. Many books and papers were published.

To strengthen the vocational education research, an independent vocational education research group was established in the national educational science study program. During the period of the Sixth Five-year Plan, as mentioned above, the research focused on the introduction and dissemination of the foreign experiences, so only one subject named "Vocational Education Study" was listed in the national educational science program. However, the research was remarkably effective. The research results show that the vocational education is the secret weapon of the economic take-off in the developed countries, so we must develop the vocational education according to our own situation to revitalize the economy. The State Educational Commission attached great importance to this conclusion and issued *the Decision of the CPC Central Committee on Educational Restructuring*. Since then, it has become one of the basic policies of our country to develop vocational education.

The Decision of the State Council on Vigorously Developing Vocational Education published in 1992 finally established the policy of vigorously developing vocational education.

From late 80s to early 90s, with the implement of the Decision of the CPC Central Committee on the Educational Restructuring, China's vocational education developed rapidly, creating urgent demands for the leading theoretical guidance and longer term national programs. Under this circumstance, the Seventh Five-year Plan set up a series of key research subjects, carrying forward in an all-round way the vocational education research. The subjects are as follows:

- the vocational education research and experiments aimed at promoting the economic development in the old revolutionary base areas, minority areas, mountainous areas, frontier areas and the hometowns of overseas Chinese;

- the research of the vocational education development strategy oriented towards the year of 2,000;
- the research on basic vocational education theories;
- the research on vocational education systems;
- the research on the development strategy of the electronic industry education;
- the research on the vocational education for the technical workers of the machinery industry;
- the reform research on the enrollment and allocation systems for secondary agricultural schools;
- the research and experiments of the teaching orientation, training specification, teaching models and quality evaluation for secondary vocational schools;
- the research on higher vocational education;
- the reform research on the development of vocational education and relevant personnel rules and regulations;
- the research and experiments of career instructions;
- the vocational teachers training system and quality requirements.

During this period, in shortage of vocational education research resources, many non-professionals including a large number of executive officials were dedicated to the vocational education research and published great many monographs on vocational education. One of the major research effects is the impact on the policy-making. In 1992, The Decision of the State Council on Vigorously Developing Vocational Education came into the world and thus established the policy of vigorously developing vocational education in our country.

The Outline of China's Education Reform and Development published in 1994 explicitly put forward the objectives of the vocational education reform and development.

The Decision of the State Council on Vigorously Developing Vocational Education was published in 1992 when China's economic system began its radical change into the socialist market economy. It brought about the question of how to adapt the overall education, including vocational education to the economic situation. Therefore, the research subjects in the Eighth Five-year Plan were doubled. Great importance was attached to the vocational education in enterprises and urban areas. The theory and practice of the comprehensive enterprise education reform have been listed among the research focal points on

the state level. Meanwhile, the research on the functions of the vocational education development, the research and experiments on the training of the advanced technical workers, the research on the urban vocational education prediction and the urban employment issues, the research and experiments on the reform of the vocational education management system, and the research on the vocational education in the special economic zones were also carried forward and became hot topics.

The success of rural economic reform created demands for the corresponding development of vocational education. The research on the rural vocational education attracted wide attention, and the research on the development strategy of China's agricultural education became a key state-level research subject. Weighing a quarter of all the research subjects in the program, the research subjects on the rural vocational education are no less than that on the urban or the enterprise vocational education.

As it involves some complicated and dynamic factors such as population, economy, social and governmental decisions, the problem of vocational education structure has always been the focus of researches. The research on the junior-middle-school-above education structure, the research on the structure and the teaching models of the senior middle schools, and the research on the junior-middle-school-above technical education were re-established as the research subjects, constituting the sub-hot points in the Eighth Five-year Plan.

The research on the historical facts was strengthened, and the research on higher vocational education changed from a frontier problem into a hot problem. The researches were conducted in an all-round way as the research subjects ranged from the macro development strategy to the concrete training objectives and the intellectual specification. As was reflected in the Eighth Five-year Plan, to carry out part of the vocational education by means of the social forces became a new research subject under the socialist market economy system. The secondary vocational education had been developed to a relatively large scale. The quality issue began to attract attention, and the professional education quality evaluation was established as a research subject. The comparative study objects turned to Singapore and other Asian-Pacific countries and regions.

The analysis above shows that the vocational education research at

this stage was remarkably improved both in scope and depth. The theoretical and practical research abilities were greatly improved. The conversion from the research results to the policy-making was enhanced and the time was shortened. It helped increase the scientific contents of the policies.

The Vocational Education Law of the People's Republic of China published in 1996 established legally the status, functions and development principles of vocational education. The Higher Education Law of the People's Republic of China published in 1998 set it down in the law that higher vocational education is an important components of higher education.

The Vocational Education Law and the Higher Education Law are two important laws on vocational education during the period of the Ninth Five-year Plan, offering a complete definition of vocational education. If the researchers throughout the country had not been working diligently on the theories and practice of vocational education, it would have been impossible for the Vocational Education Law to come into the world. It can be said that the Vocational Education Law is the crystal of the educational researches in all these years. It is needless to prove the significance of the Vocational Education Law. It was the vocational education research that promoted the promulgation of the Vocational Education Law and the Law in return advanced the development of the vocational education research. As a conspicuous example, the research subjects held by the vocational education study group in the Ninth Five-year Plan amounts to half of that in the previous Five-year Plans.

Apart from contributing to the making of each major educational policy, the vocational education research has also enriched the vocational education practice through the pilot experiments. Since 1980s, about 30 pilot experiments on vocational education have been conducted throughout the country. These pilot experiments have used for reference the international advanced vocational education experiences such as the German "Dual System", the Canadian CBE System and the MES System of the international Labor Organization. They helped our theoretical and practical researchers broaden their eyes, set free their imagination and inspire their creativity.

The function of the vocational education research is also embodied in that it can help change people's old and traditional ideas by

popularizing the vocational education research results and theories. Among all kinds of modernization, the modernization of man's mind is the most difficult one. Conservative way of thinking is the greatest profound obstacle for modernization, which is also true of the educational modernization. A factor that has long upset the development of the vocational education in our country is the traditional thoughts. Another factor is that the theoretical level of some vocational education professionals and even some policy makers is low. The state level research subjects above have brought along the research of all levels. In the process of the research, the vocational teaching staff have set free their own imagination, changed their traditional ideas and improved their understanding of the situation. This, in turn, has greatly improved the external social and cultural conditions for the development of the vocational education.

The above is a review of the role performed by the vocational education research. The multitudinous research subjects are carried out under the joint efforts made by the vocational education research institutions and staff throughout the country. Comparing with that of other education research teams, the overall level of the vocational research staff is still low. However, they have made great achievements under the most difficult circumstances. Shanghai Institute of Vocational and Technical Education can serve as a concrete example in this respect.

The following are the major problems facing the present vocational education research: 1) the research systems of the vocational education at different levels have not been completed; 2) the information exchange between the researches of all types and all levels is not unblocked; and 3) all the research institutions are still short of research personnel. The situation requires us to strengthen the international exchange and cooperation and continuously improve the quality of the research so as to promote the development of the vocational education in our country.

Note

Due to shortage of time, there was no discussion after Cheng Yonglin's report.

NEW TRENDS OF DEVELOPMENT AND REFORM OF TECHNICAL AND VOCATIONAL EDUCATION IN THE 21ST CENTURY

The Outline

Translated by: Zheng Junhua

An International Symposium on "New Trends of Development and Models of Reform in the Field of Vocational Education and Training in the Transition to the 21th Century" with participants from China (Mainland and Taiwan), Germany, Korea, Singapore and Thailand was held in Shanghai from October 26th to October 28th, 1998. The participants discussed a wide range of topics concerning new developments and the future challenges in the field of vocational training in various countries with special regard to the situation in Southeast Asian countries. Topics of interest included new strategies to respond to changes of fast changing labour markets and new concepts of how to develop human resources in world of accelerating economic and social change. Particular emphasis was put on the role of scientific research during the processes of implementation and supervision of vocational training programmes as well as on the issue of environmental education in vocational training. Facing at the same time the risks and challenges of globalisation, the participants agreed that international exchange is of ever-growing importance. In order to apply international experiences in a more effective way and to create a deeper understanding of the conditions under which successful future models can be developed, the participants suggest to enhance international cooperation in the field of vocational education. Some participants expressed the hope that the results of this small scale conference in Shanghai could make some contributions to the Second International UNESCO-Congress on Technical and Vocational Education, which will be held in Seoul (Korea) next year.

Besides the representatives of different countries and regions, the representatives of Shanghai Education Commission, Shanghai Construction Commission, Shanghai Labour Bureau, Shanghai Educational Development Foundation, Shanghai Institute of Educational Research, some academicians and researchers of RIBB-S also attended the three-day conference. All the participants took active

part in the discussion over a wide range of topics concerning the changing demands and the impact of globalization, high technologies and changing labour market on TVE.

The main points include:

1. The changes of TVE's role and functions in the 21st century:
 - Orientation on the true needs of all parties concerned (enterprises, trainees, parents, etc.).
 - Concepts and models of life-long learning.
 - The role of TVE in addressing the unemployment and providing further education/re-training.
2. The contents of TVE in the 21st century:
 - Developing TVE programs to suit the development in advance.
 - Emphasis on generic skills to upgrade the flexibility and re-trainability of the trainees.
 - Emphasis on key qualifications (fundamental competencies)
 - Importance of environmental learning in TVE.
3. The measures, forms and other issues of TVE in the 21st century:
 - Better integration of school-based learning with work-based learning.
 - The importance of practical learning, value of in-company training.
 - Importance of research works on TVE

In an era of fast-developing Knowledge Economy and information technology, facing at the same time the risks and challenges of globalization, the participants unanimously agreed that further exchange of experience and information would be beneficial to all. In order to apply international experiences in a more effective way to create a deeper understanding of the conditions under which successful future models can be developed, the participants suggested to enhance international cooperation in the field of TVE through different channels. The participants proposed to hold further conferences in other countries and seek respective authorities for assistance and support. Shanghai Institute of Vocational and Technical Education (RIBB-S) is willing to serve as the liaison office for future and continuous international cooperation. The proposed conferences may focus on some realistic problems of common interests. Some of the problems are:

- Changing the goal of TVE to suit the fast development of high technology.
- The impact of globalization on the specialties and curricular structure of TVE.
- The integration of school-based learning and in-company training; the cooperation between schools and enterprises.
- The development of TVE in developing regions and rural areas.
- The influence of the German Dual System on TVE all over the world. (especially Asia)
- Functions of TVE in the rapidly changing labour market.
- The quality, teachers' ability, vocational certificates, managing system, investing policies and modern teaching strategies of TVE.
- Methods of applied research and evaluation in TVE
- Ways and experiences of environmental learning in TVE
- Models of TVE in rural areas of Southeast-Asia

In the last day of the conference, the panel discussion attended by all the participants were centered around the following three topics:

1. What is the impact of the 21st Century on Technical and Vocational Education (TVE)?
2. How should TVE suit to the new situation? What reform, adjustment and renovation are required for TVE? What are the future models of TVE?
3. How would TVE benefit from international cooperation in this field?

A brief closing ceremony was held after a discussion over the final report. Hu Ruiwen, director of Shanghai Institute of Educational Research, delivered a speech. Cheng Yonglin, director of Shanghai Institute of Vocational and Technical Education, declared the formal closure of this conference.

Agenda

Monday, Oct. 26		
Morning	9:00	Opening Ceremony
	9:45	Presentation Country Report P.R. China Mr. Yu Zuguang (Associate Professor) Vice-Director ZIBB, Beijing
	10:45	Break
	11:00	Presentation Country Report Germany Dr. Hans-Guenter Wagner GTZ
	12:00	Banquet
Afternoon	1:30	Presentation Country Report Korea Dr. Shin Ikhyun Korea Research Institute for Vocational Education and Training
	2:30	Presentation Country Report Singapore Edward Ho Head of Engineer Department of Nanyang Polytechnic Singapore
	3:30	Break
	3:45	Presentation Country Report Thailand Mrs. Pavanuj Fungladda Head of Skill Development Centre Nontaburi, Thailand
	4:45	Presentation Prof. Cheng Yonglin Director Shanghai Regional Institute of Vocational Training
	6:00	Supper
Tuesday, Oct. 27		
Morning	9:00	Presentation Prof. Fu Hung Yuan National Changhua University of Education and Feng Chia University
	10:00	Break
	10:15	Presentation Prof. Kuang Ku Chen National Changhua University of Education
	11:15	Presentation Prof. Liu Chunsheng Tianjin University
	12:15	Lunch
Afternoon	1:30	Visiting a vocational school Visiting Shanghai TV-Tower
Wednesday, Oct. 28		
Morning	9:00	Panel discussion
	10:30	Break
	10:45	Panel discussion
	12:00	Lunch
Afternoon	1:30	Panel discussion
	3:00	Break
	3:15	Discussion on the Final Report
	4:15	Closing Ceremony

上海职业技术教育研究所

Regional Institute of Vocational and Technical Education Shanghai

ABOUT US

The Regional Institute of Vocational and Technical Education (RIVB-S) is a German-Chinese Cooperation project in the field of vocational and technical education which belongs to the Educational Commission of Shanghai. The German part is supported by the Federal Ministry of Economic Cooperation and Development in whose order the German contribution is provided by the German Agency of Technical cooperation. Established in 1990, the Institute makes contributions to improve the quality of vocational and technical education in Shanghai. The scope of action covers a wide field of various activities:

- Advise the city government of Shanghai concerning new systems, concepts and the strategy of reform in the area of vocational education.
- Development of new curricula and teaching aids. The Institute takes part in the curriculum reform committee established by the Educational Commission of Shanghai and makes conceptual and practical contributions towards practice oriented curricula which are able to meet occupational requirements.
- Run of pilot projects. Under the guidance of RIVB-S there are more than 10 pilot projects at vocational schools in Shanghai which cover technical occupations as well as the field of business education. In the pilot projects, new methods of pupil oriented learning are applied and respective instructional materials and media are in use. In order to train skilled people with a high degree of flexibility, particular emphasis is put on a close connection between a broad basis training followed by a stage of specialisation.
- Organization of programmes for further education of school managerial staff and for teachers of vocational schools. The obligatory further education programme for principals of the city government of Shanghai is planned, organized and executed by RIVB-S.
- Applied research. The research work of the institute includes conceptual studies and empirical field work by order from the City government of Shanghai as well as another public and private institutions.
- Dissemination of successful models of vocational training and corresponding international experiences.